

On the Measurement of Human Development.

Mozaffar Qizilbash.
School of Economic and Social Studies,
UEA,
Norwich,
NR4 7TJ.
E-mail: mozaffarq@hotmail.com

Lecture Prepared for the UNDP Training Course, Oxford, 11 September 2002.

0. Organization of the Lecture.

I shall focus - as Frances Stewart has asked me - on criticisms of some of the UNDP's measures of development. However, before doing so I shall introduce the origins of the UNDP's work on development (in section 1) and the actual construction of two of these measures (in section 2). I shall then move on to three sorts of criticism: those relating to the coherence of the UNDP measures and to their multidimensionality (in section 3); those relating to their ambitions and robustness (in section 4); and those relating to the universality and context sensitivity of these measures (in section 5). I then conclude (section 6).

1. Origins.

The notion of human development has a considerable intellectual heritage. However, the idea may not have reached the audience that it has today had it not been for the work of the United Nations Development Programme (UNDP) and the efforts of Mahbub ul Haq. Mahbub was much concerned that development economists had forgotten that, in thinking about development, their focus ought to be on human beings. There was a need thus, on his view, for an approach which would account for *human* progress and misery. Just as there are systems of national accounts giving details on investment in capital machinery and income, there needed to be tables cataloguing the state and progress of human lives - a 'human

balance sheet' (Haq, 1995, p.5). Any adequate approach would treat human beings as both ends in themselves as well as the means of development. Inasmuch as the idea that human beings are 'means' is captured in the literature on 'human capital', the distinctive contribution of the human development literature has been the stress on human beings as ends in themselves.

Mahbub ul Haq's basic vision was shared by many others. Indeed, many of those who worked with him - Paul Streeten and Frances Stewart - were also involved earlier (Streeten, *et al*, 1981) with the 'basic needs' school in development economics which also stressed human well-being. However, a very deep influence on how the UNDP's work took shape came from Amartya Sen, who had, since the early 1980s been developing his own approach to thinking about human progress, as well as justice (Sen, 1985 and 1999). This approach has come to be known as the 'capability approach' - the idea was that economic development was best thought of in terms of an expansion in people's freedoms, their abilities to lead the lives they valued. With Sen's involvement in the UNDP's work on human development the annual publication of the *Human Development Reports (HDRs)* came to use and to attempt to apply the language of human capabilities. They did so in ways which might not be too attractive to those who had seriously followed Sen's theoretical work. Nonetheless, increasingly, a coherent set of measures emerged from the UNDP reports. In retrospect, Sen's work with the UNDP has become one example of how the capability approach could be used in a specific policy oriented context. Sen's writings on capability, furthermore, have deep roots in philosophy and economics - the focus on human freedom is shared by many, including John Stuart Mill, Adam Smith and Karl Marx. Like Mahbub ul Haq and the members of the basic needs school, Sen was very concerned with a focus on human lives - and the ability to lead lives which are valuable. For Sen, Mahbub ul Haq's arrival at the UNDP created an

opportunity to apply this approach and to bring it to a large policy oriented audience.

Nonetheless, the way in which the UNDP's measures took shape and evolved was messy. The first index to come into existence - the human development index (HDI) - has gone through a number of changes over the early years, which threatened to undermine its credibility, certainly as regards inter-temporal comparisons of the HDI. Similarly, the first attempt to develop a variation of the HDI which would take account of gender differences was very simple, and slowly, a more refined methodology - using the work of A.B. Atkinson - for dealing with gender inequality was incorporated in later *HDR* notably *HDR* 1995. Similarly, the first attempt to develop a measure of 'human poverty' - the 'capability poverty measure' (in *HDR*, 1996) - fell by the wayside and was immediately replaced by the human poverty index (HPI) in *HDR* 1997. We do, nonetheless, now have a range of measures which are published annually and which are firmly rooted in serious academic work. The publicity surrounding the annual publication of the reports has brought them to a wide audience, and made them salient in policy discussions.

2. Measures of Human Development.

The idea of 'human development' involves increases in the quality of life. Those who subscribe to the view that human development matters are not, typically, content to treat GNP as an adequate alternative to direct indicators of the quality of life. There are - broadly speaking - two different views among those who take a 'human development' view. First, there are those who hold to a broad conception of human development. Those who take such a view are concerned about increases in the quality of life, as well as with other values like equity, basic human rights and so on. They would also be concerned about equality between and within generations - and to that degree with *sustainable* human development. This broad

approach which has been in effect been pursued in the UNDP's *HDRs*. On the other hand, there are more narrow notions of human development, which focus primarily on basic needs and well-being and are not concerned with other values.

Both narrow and broad views of human development would be concerned to develop a measure of the quality of life which looks at it *directly*. That is, they would be concerned that focus should be on *direct* measures of the quality of life. In part, this motivation emerged from the insight that - at the individual level - different people need different amounts of income to live a life which is valuable. The same basic insight was thought to be relevant at the national level - countries with similar levels of GNP per capita could have very different levels of achievement in terms of direct measures of the quality of life. Some, were also concerned that in looking at human progress the distribution of that progress would also be taken account of. GNP did not take account of this concern - though there had been attempts to allow for inequality in adjusted measures of income and growth (Sen, 197?).

The first well-known index which focussed *entirely* on direct measures - focussing on life expectancy, infant mortality, and literacy - was Morris D. Morris's Physical Quality of Life Index (PQLI). The HDI used a similar methodology. It involved focussing on three 'dimensions' of human development or 'choices' - health, education and the ability to achieve a 'decent standard of living'. The first of these was measured by life expectancy at birth, the second was measured by an knowledge index - which in its present form involves the adult literacy rate (2/3 weight) and the combined enrolment ratio (1/3 weight) - and the third has been measured in terms of income, with - in the initial formulation - some adjustments being made for incomes above a certain level. In its most recent form the income component of the HDI simply involves allowing for 'diminishing returns' to increases in income by taking the log of income. In general, the HDI involves allowing for a maximum

and minimum level of achievement in each dimension. If country j 's level of achievement in dimension i is A_{ij} and $\text{Max } A_i$ and $\text{Min } A_i$ are the maximum and minimum levels of achievement in that dimension, then the country j 's index for dimension i , I_{ij} , is :

$$(1) \quad I_{ij} = (A_{ij} - \text{Min } A_i) / (\text{Max } A_i - \text{Min } A_i).$$

In the case of the education, the maximum and minimum levels are not controversial - 0% and 100% are natural choices for minimum and maximum levels of the component measures. In the cases of income and life expectancy, however, there have always been problems. In recent reports, the life expectancy maximum and minimum have been set consistently at 85 years and 25 years. In the case of income, the maximum and minimum figures at present are \$40,000 and \$100, so that (given the need to allow for diminishing returns) the maximum and minimum figures used in (1) would be $\log(40,000)$ and $\log(100)$ and A_{ij} is the log of the actual income level of country j . The HDI is then:

$$(2) \quad \text{HDI}_j = \left(\frac{1}{3} \right)^{\frac{1}{3}} \prod_{i=1}^3 I_{ij}$$

The three dimensions are given equal weight in this formulation. The HDI has a maximum value of 1. The human poverty index for developing countries (HPI-1) published since *HDR* 1997 also involves the same three dimensions. If poverty in dimension i in country j is P_{ij} and the weights attached to these components are w_i , $i=1,2$ and 3 , then the weighted average of power 3 is HPI-1 for country j is:

$$(3) \quad \text{HPI-1}_j = \left(\sum_{i=1} w_i P_i \right)$$

The power of the average is set above one so that a unit increase in the P_i at a higher level of deprivation has a greater impact on the overall index. In this case, also equal weighting is used so that $w_i = (1/3)$ for all i . The component indices here are: for health, the probability of not surviving beyond the age of 40; for education, the adult illiteracy rate; and for a 'decent standard of living', an equally weighted composite of the proportion of the population not using improved water resources and the proportion children under the age of 5 who are underweight.

The gender related measures which the UNDP has developed - the gender-related development index and the gender empowerment measure - also involve equal weighted averages involving multiple components. However, a specific methodology deriving from the work of A.B. Atkinson (1973)- involving the notion of 'equally distributed equivalents' for each component - is applied to the achievements of women and men to arrive at the components which are averaged. The gender measures are thus a little more complex than the HDI and HPI-1. Nonetheless, some of the general points that follow apply to them as well, since they are equally weighted multi-component measures. Furthermore, similar indices have been developed to take account of other aspects of development. For example, Meghnad Desai (1995) developed various green indices, one of which - the 'cardinal green index' - used the same basic methodology as the HDI.

3. Criticisms Relating to Coherence and Multidimensionality.

A recurring problem involved in the construction of the HDI, as well as some of the other UNDP measures, has been about the use of the income component. Inasmuch as work on human development is motivated by a concern with difficulties involved in income

measures, it seems odd to introduce an income index as one of the three components of the HDI. In fact, the HDI can be treated as a pragmatic measure which allows for income as well as some direct quality of life measures. That makes it distinctly different from the PQLI. However, it is not then, perhaps, best thought of as a 'pure' measure of human development as such.

A defence of the income component emerges explicitly in a discussion by Sudhir Anand and Amartya Sen (2000, pp. 99-100), who explicitly 'own up' to the conceptual difficulty of including an income index in the HDI. They, in effect, argue that the income component is a 'catch all' which covers capabilities which are related to a person's command over resources. Anand and Sen explicitly state that such command is not *intrinsically valued*. It is just an *indirect* indicator - a proxy for some capabilities as well as a prerequisite (or 'causal antecedent') for the ability to do various things.

The inclusion of the income component does nonetheless threaten the 'purity' of the HDI as a measure of human development which can be contrasted with GNP. On the other hand, it can be argued that the chief problem which the HDI was supposed to respond to was the 'monoconcentration' - as Amartya Sen (2000) puts it - on GNP. Sen compares this monoconcentration with the focus on 'utility' in utilitarian moral philosophy. If it is viewed in this way, the HDI is best thought of as a pluralist measure of the quality of life which *encompasses* income rather than providing an alternative to it. That is certainly how Mahbub ul Haq describes it (Haq, 1995, pp. 14-15)

If there are questions which relate to what is *included* in the HDI - particularly income - there are equally questions about what is *excluded*. Inasmuch as HDI is a pluralist measure of the quality of life, it can be argued that there are several other dimensions of human development. Indeed, there is growing discussion about the components of well-being

- involving various 'lists' which have been put forward by various commentators (Alkire, 2002) - which ought to be used in thinking about, and applying various views of the quality of life. Irrespective of the disagreements between commentators with different views about this issue, the general range of dimensions involved in this discussion is much broader than the three components of the HDI. Items which are often mentioned include shelter, self-respect, cleanliness or sanitation, religion, safety, enjoyment, security, hope and religion. They typically go beyond the usual list of 'basic needs'. It is not obvious that all the components listed here can be measured, and even if they could be measured it is not obvious that they ought to be introduced into the HDI. The *HDRs* need, nonetheless, to address the full range of dimensions of human development, if, as the UNDP has done, we use a broad conception of human development. We cannot fail to discuss such matters simply on the grounds that there is little data on them. In fact, much of the data which is compiled in the *HDRs* includes information which relates to some of these items. In spite of the fact that the HDI only focusses on three components, it is best thought of as an index which represents a corrective counterweight to the 'monoconcentration' on GNP per capita. Its link to the human development approach can, thus, be seen as a 'strategic' measure to reduce the monoconcentration on GNP per capita. Given the purpose of the HDI, there is considerable scope to work on further measures of the quality of life, involving dimensions of well-being - such as shelter - which are not included in the HDI.

As regards the HPI-1, this has not yet had the sort of 'eye-catching' publicity that the HDI has. This might be in part because it is not directly comparable with standard income or expenditure or consumption poverty headcounts. In the HPI-1 the components of the index relate to 'shortfalls' in each dimension. These shortfalls are then averaged in a specific way to arrive at HPI-1. What is not shown in the UNDP data is how many people fall below the

relevant critical cut-off in terms of more than one of the dimensions. So we cannot infer from the published data how many people are poor on all the dimensions, or on two of them or just one (Dutta, Pattanaik and Xu, forthcoming). Why might this matter? It would depend on how one dealt with multi-dimensionality. Take two approaches. On the first, we might say that being poor involves falling below some critical level on all dimensions of poverty. On the other, being poor just involves falling below the critical level on any one dimension. Given these two methodologies, we might be faced with a situation where 15% of the population is below the critical level on each dimension. If the population which falls below the critical level on each dimension is mutually exclusive the headcount of poverty is 30% on the second methodology. It is 0 % according to the first methodology. If it is the same group that is poor on all dimensions, both methodologies give the same answer. We cannot distinguish the two cases without information about the overlaps between those who fall below the critical levels in the different dimensions.

The sort of multi-dimensional data which is needed to examine these issues is not as yet published in the *HDRs*. If it were available, human poverty indices which are comparable to income headcount indices would no doubt emerge. Nonetheless, the issue of how to deal with multi-dimensionality would remain. In some specific cases, information of this sort is available and measures of capability poverty incidence have been developed. An example is Stephan Klasen's study of South Africa (Klasen, 2000) - which allows for multi-dimensional information, but nonetheless uses a weighted average similar to the UNDP rankings. Similar information might be available from the World Bank's LSMS data sets. However, this sort of information might be needed if human poverty indices are to rival the traditional headcounts.

While the way in which 'human development' is thought of as 'multi-dimensional' usually focusses on the many dimensions of the *quality of life* (Alkire, 2002), it is also true

that broad approaches to human development also emphasize values such as equity - within and between generations - and human rights. The HDI is perhaps best regarded as a measure which looks at one of these concerns - the quality of life, rather than a measure which also allows for considerations relating to distributional concerns. So to take account of those concerns there would be a need to take into account the distribution of the components of the HDI. One might develop various related measures as the UNDP does. Or, one might adjust the HDI using measures of inequality etc. to develop a 'broad' measure of development. This sort of approach is attempted by Douglas Hicks inequality-adjusted HDI (Hicks, 1997). However, with the GEM and GDI, does in effect, take on inequality as a distinct concern. It is, nonetheless, an anomaly that the UNDP has done this primarily with respect to gender - there are other inequalities, such as inequalities between the different ethnic groups which are important (Stewart, 2002). The same general methodology that the UNDP uses in the case of gender can be used in this, as well as other contexts. However, another reason for keeping these measures distinct relates to the possible 'incomparability' or 'incommensurability' of concerns such as well-being and equality. Even if it can be argued that the dimensions of human well-being can be compared (Griffin, 1986), it is harder to press the view that all the things that can matter for human development when it is broadly construed can be captured in one number or one index. There is after all a danger that the measure might lose meaning if not communicative force. To capture all the different concerns there is thus good reason to look for a whole range of measures. That remains a challenge for the UNDP.

4. Criticisms Relating to the Ambitions and Robustness of the Measures.

The ambition of the *HDRs* has involved not merely providing a ranking of countries according to the quality of life. It has also been to give a picture of *how far* countries have

moved toward ‘complete’ human development - i.e. a HDI score of one. HDI comparisons give us a picture of the levels of achievement of different countries, and of differences in levels of achievement. Some argue that to attempt to measure such levels and differences in levels of achievement is too ambitious given the quality of the data. If there are biases in the data - say because all the enrolment data are too high - then the *ordering* of countries according to the various indices may nonetheless be much the same. If that ordering is robust to biases in the data, it might be worth focussing exclusively on rank order or ‘ordinal’ information - which gives the rank order of countries in terms of achievement in terms of various direct indices.

This approach has been advocated by Partha Dasgupta (1993 and 2001) in the context of international comparisons of well-being. Dasgupta has also used much the same approach to ranking in the context of gender inequality among Indian states. In both contexts, he has used rank order information and simply added up the rank order in terms of each index to give the ‘Borda score’ and ranked countries in terms of this score to give a ‘Borda ranking.’ A similar approach has been taken by Meghnad Desai in his work on ‘Greening the HDI?’. Worries about the indices relating to the environment lead Desai to present an ‘ordinal green index’ - which like the Borda score focusses only on ordinal information - alongside his ‘cardinal green index’ - which is an attempt at an ‘equivalent’ of the HDI for ‘environmental protection.’

It might be argued that as long as the same, or similar, direct measures are used in the UNDP measures and in the Borda rankings, much the same rankings would emerge. That turns out not to be true. Consider for example the ranking according the HPI-1 for 74 countries on which there is information on indicators relating to literacy, sanitation, nutrition, and health in the 1997 *HDR*. These indicators are presented in Table 1. The Borda ranking of

these countries is given in table 2, with the best country in the set ranked 74 (Cuba) and the worst country in the set (Ethiopia) ranked 1. (In the case of ties two countries would be ranked 66 if they both have 65 countries worse than them). In table 3 the HPI-1 ranking is done in exactly the same way, so that the country with the highest HPI-1 (Trinidad and Tobago) is ranked 74 and the country with the lowest HPI-1 (Niger) ranked 1. The final column in this table gives the difference between HPI-1 and Borda ranks. Surprisingly, there are occasions where this number is quite large. So the two methodologies can lead to rather different results. It is easy to show that this is also the case with the other UNDP measures. So the rankings are quite sensitive to the particular ranking scheme adopted.

All the UNDP measures use equal weights in aggregating dimensions. In discussing the decision to use equal weights in the construction of the HDI, Mahbub ul Haq (Haq, 1995, p. 49) claimed that experimentation with different weighting schemes did not yield very different results. That suggests that human development rankings are not very sensitive to alterations in the weighting scheme. However, this is not obviously so. For example, equal weighting is effectively used in the Borda ranking of countries. In some such exercises, clearly, however, use of a different set of weights would no doubt have led to different results. Take the Borda ranking carried out by Partha Dasgupta (1993 and 2001). If, rather than using equal weights, one had given a higher weight to political and civil rights, then that the ranking between India and China might be reversed (Qizilbash, 1997). Inasmuch as it can be argued that the difference in rankings here relates purely to the different priorities set by the two countries - with India giving more weight to rights than China - the assumption of equal weights for all countries seems inappropriate. There are, nonetheless, problems here. The weights used in these rankings might - in the above discussion - reflect the view of *national governments*. However, these governments are may not be representative of the

opinions of the relevant countries. It might be argued that we ought to be really interested in the weight ordinary people in these countries, rather than national governments, give to different dimensions. Nonetheless, inasmuch as the weights different people, or representatives of countries, give to the various dimensions matters, it is worth providing a sensitivity analysis of these results to show whether, and if so, how much, the rankings depend on the weights used.

Much of the literature on the UNDP measures (Noorbaksh, 1998? and Lüchters and Menkhoff, 1996) has been about the actual way the index has been constructed - particularly worries about the income component in the HDI. Earlier there was also considerable worry about the fact that the maxima and minima used in the HDI sometimes changed. In fact the worry about different 'goal posts' persists, because it has been argued that the ranges used in the HDI alter the effective weight given to the different dimensions (Panigrahi and Sivramkrishna, 2002). Nonetheless, the UNDP have (effectively) stuck to the same maxima and minima for some years now. It is not likely that these will - nor is it likely that they should - change. So there is limited chance that the effective weights given to the components of HDI will change much.

5. Criticisms Relating to the Universality and Context Sensitivity of the Measures.

There has always been a standard criticism that the human development literature presupposes a 'universalist' paradigm of development. This is certainly true to some degree. The literature on human development is addressed to actual and potential human beings wherever - irrespective of culture or nation or social group - they are. Inevitably, this means that the human development paradigm does not take cultural differences into account. Rather it looks for a level which is culturally invariant.

Criticisms relating to cultural differences are rebutted through the claim that while there are certain values which we all share, they are 'realised' - take concrete form - in different ways in different cultures and nations. If the UNDP's measures focus on certain central dimensions of human well-being, and relatively uncontroversial indices, that is because they are meant for a specific purpose - international comparisons. At that level cultural differences seem to be unimportant when it comes to endorsing the main ingredients of the HDI and related UNDP indices. More culturally rich information might - on the other hand - be relevant at the country, or regional level.

Even if the central focus is on international comparisons, however, it can, nonetheless, be argued that the HDI is better at discriminating between the performances of 'poor' countries than those of 'rich' countries. It has thus been argued (Anand and Sen?) that there might be separate HDIs for different groups of countries. In developing the human poverty index, furthermore, this has explicitly been done with the HPI-1 for less developed countries and the HPI-2 for the more industrialised nations.

However, the main context in which culturally rich data, which takes into account the local way of life, is likely to be taken into account is in the national *HDRs*. There has, nonetheless, been an explosion in the publication of such national *HDRs*. However, there has also been a tendency for the national *HDRs* to mimic the UNDP *HDRs*. The national *HDR* focusses on estimates of the HDI at the national level as well as at the regional level. In this context, there is considerable scope to use a wider variety of measures. Since information at the national level is richer, there is also more scope to take account of multi-dimensionality and a wider set of measures which at thought to be relevant at the particular country level.

6. *Conclusions.*

References

- Alkire, S. (2002) 'Dimensions of Human Development.' *World Development* 30: 181-205.
- Anand and Sen (2000) 'The Income Component of the Human Development Index.' *Journal of Human Development* 1: 17-23.
- Atkinson A.B. (1973) 'On the Measurement of Inequality.' *Journal of Economic Theory* 2:244-263.
- Dasgupta, P. (1993) *An Inquiry into Well-Being and Destitution*. Oxford: Oxford University Press.
- Dasgupta, P. (2001) *Human Well-Being and the Natural Environment*. Oxford: Oxford University Press.
- Desai, M. (1995) 'Greening the HDI?' In Alex Macgillivray (ed.) *Accounting for Change*, London: New Economics Foundation.
- Dutta, I., Pattanaik P. K. and Xu Y. (forthcoming) 'On Measuring Deprivation and the Standard of Living in a Multi-dimensional Framework on the Basis of Aggregate Data.' *Economica*.
- Griffin, J. (1986) *Well-Being: Its Meaning, Measurement and Moral Importance*. Oxford: Clarendon Press.
- Haq, M (1995) *Reflections on Human Development*. New York: Oxford University Press.
- Hicks, D. (1997) 'The Inequality-Adjusted Human Development Index: A Constructive Proposal.' *World Development* 25: 1283-1298.
- Klasen S. (2000) 'Measuring Poverty and Deprivation in South Africa.' *Review of Income and Wealth*. 46: 33-58.
- Lüchters G. and Menkhoff, L. (1996) 'Human Development as a Statistical Artefact.' *World*

Development. 24: 1385-1392.

Noorbaksh, F. (1998?) 'A Modified Human Development Index.' *World Development*.
Vol.no.: 517-528.

Panigrahi, R. and Sivramkrishna, S. (2002) 'An Adjusted Human Development Index:
Robust Country Rankings with Respect to the Choice of Fixed Maximum and Minimum
Indicator Values.' *Journal of Human Development* 3: 301-311.

Qizilbash (1997) 'Pluralism and Well-Being Indices.' *World Development*. 25: 2009-2026.

Sen A.K. (1985) *Commodities and Capabilities*. Amsterdam: North-Holland.

Sen A.K. (1999) *Development as Freedom*. Oxford: Oxford University Press.

Sen A.K. (2000) 'A Decade of Human Development.' *Journal of Human Development*. 1:
17-23.

United Nations Development Programme (Various Years) *Human Development Report*.
Oxford: Oxford University Press.

On the Measurement of Human Development

0. Introduction.

I will discuss:

- (1) the origins of the work on human development (HD)
- (2) the actual measures used, with a focus on two measures.
- (3) criticisms which relate to coherence and multi-dimensionality of UNDP measures
- (4) criticisms relating to the ambitions and robustness of the UNDP measures
- (5) criticisms relating to universality and context sensitivity of HD and UNDP measures

1. Origins.

* In the work of Mahbub ul Haq (1995) - and the idea of a 'human balance sheet' as opposed to standard economic accounting, and worries about focus on GNP. Mahbub joins UNDP in late 1980s.

* In the work of the basic needs school - Paul Streeten, Frances Stewart and Norman Hicks (1981) *inter alia*. Related work on finding a basic needs measure - the PQLI (Morriss)

* In the work of Amartya Sen (1985, 1999 etc.) and his capability approach to development, which stressed worries about income measurement of the quality of life. A concern with looking directly at human lives - and direct measurement.

* the idea of human beings as ends in themselves is common to most such views - contrast with the 'human capital' approach.

* The Human Development Reports (HDRs) provide a platform for these views to reach a broad audience.

2. Conceptions and Measures of HD.

Narrow and Broad Conceptions of HD.

It is worth distinguishing at the outset between two views of HD -

(A) broad - allows for values other than those which constitute well-being - so equity (between and within generations), participation, rights and so on.

(B) narrow - focusses only on the more central aspects of well-being and does not go beyond (partly for fear of being attacked for being culturally biased towards Western values - vis gender inequality).

(A) has been the approach taken by the UNDP.

The *Human Development Index* (HDI)

HDI can be regarded as a measure of HD narrowly construed.

Writing country j 's level of achievement in dimension i as A_{ij} , set $\text{Max } A_i$ and $\text{Min } A_i$ as the maximum and minimum levels of achievement in that dimension.

Country j 's index for dimension i , I_{ij} , would be :

$$(1) \quad I_{ij} = (A_{ij} - \text{Min } A_i) / (\text{Max } A_i - \text{Min } A_i).$$

Component Indices and Maximum and Minimum Values

Knowledge: Literacy (2/3) and Combined Enrolment (1/3). Max 100%, and Min 0%

'Decent Standard of Living' or income. In recent reports: maximum and minimum figures are \$40,000 and \$100, and logs are taken so that the maximum and minimum figures used in (1) would be $\log(40,000)$ and $\log(100)$ and A_{ij} is the log of the actual income level of country j .

Health: life expectancy at birth. Max at 85 years and Min at 25 years.

The HDI is then:

$$(2) \quad \text{HDI}_j = (1/3) \sum_{i=1}^3 I_{ij}$$

The three dimensions are given equal weight in this formulation. The Maximum value is 1.

The Human Poverty Index.

If poverty in dimension i in country j is P_{ij} and the weights attached to these components are w_i , $i=1,2$ and 3 , then the weighted average of power 3 is HPI-1 for country j is:

$$(3) \quad \text{HPI-1}_j = (\sum_{i=1}^3 w_i P_i)^{1/3}$$

The power of the average is set above one so that a unit increase in the P_i at a higher level of deprivation has a greater impact on the overall index.

Component indices

Health: the probability of not surviving beyond the age of 40.

Education: the adult illiteracy rate

A 'decent standard of living': a equally composite of the proportion of the population not using 'improved water resources' and the proportion children under the age of 5 who are underweight.

Gender Indices.

Similar measures have been developed to look at gender inequality, again equal weights are used, but a specific methodology developed by A. Atkinson (1973) is used.

3. Criticisms Relating Coherence and Multidimensionality

* Use of the income measure

Given critique of the income measures. Can be argued that it is not a pure HD measure?

Can be argued that income is a means not an end.

Anand and Sen (2000) defence of income component - captures or proxies capabilities which one can access with money income. Because it is a means, need to apply 'diminishing returns'.

Can regard HDI as a measure which *encompasses* income but is broader than GNP. (Mahbub's motivation?) It is also a useful corrective to GNP?

* Measures Excluded in HDI?

There is a growing literature on lists of the components of well-being or the components of HD (HD narrowly conceived) - these lists are usually more extensive.

Include e.g. self-respect, human rights and freedoms, participation, shelter, safety/security, religion/finding meaning in life, and so on.

Not all of these are measurable.

HDI does not include all these, but the HDRs do usually compile information on a lot of these.

* Dimensions Other Than Well-Being

Options - adjust HDI for them, or just present other measures?

Inequality?

Gender measures are separate from HDI - other kinds of inequality are worth looking at with the same methodology - e.g. across ethnic groups.

Green indices for intergenerational inequality? (Desai)

Attempt to adjust HDI - Hicks' inequality adjusted HDI.

* Multidimensionality and the HPI.

HPI uses information which is dimension specific - it uses three headcounts, but the final index is not a head count.

To challenge the usual income headcounts, we need information on overlaps between people who are poor on one dimension.

4 Criticisms Relating to Ambition and Robustness.

The HDI allows one to look at: (i) the level of development; (ii) differences in levels of development; (iii) international ranking of countries.

Biases and An Alternative Approach to Ranking

If there are biases in the data, so that for example all the education data are overstated, these will affect use of HDI in terms of (i) and (ii).

Nonetheless, a focus on the rankings of countries in terms of component indices will not be affected by such biases.

So it might be worth looking at just ordering countries in terms of indices and using rank orders (first, second etc.) for rankings. One method adding up rank orders and ranking according to the sum of these) is used by Dasgupta in the context of the quality of life. The Borda ranking.

One might think that Borda ranking and rankings using the UNDP methodology would be similar. But sometimes they are not. E.g. HPI-1 ranking and Borda ranking involving similar component indices.

Weighting

Robustness with respect to weights used - e.g. if political freedom is included (e.g. Dasgupta's ranking) ranking of India and China will depend on the weights used.

Might differences in weights relate to different values?

What sense to give to weights? Weights of countries? Weights of ordinary people?

Choice of maxima and minimum values can influence effective weight given to different dimensions? (Related Problem of 'Moving Goal Posts')

4 Criticisms Relating to Context Sensitivity and Universality

Critical Points

* the HDI and related indices are supposed to be relevant to all human beings

* is this so, or do the measures actually give a bogus picture, which is culturally biased (to Western Values) and which is not relevant to the local context.

* HDI is not very discriminating among richer countries

* the HDI is only appropriate for developing countries and it might be worth using different HDIs for different countries. So also HPI-1 and HPI-2 for different countries.

Possible Responses:

* the UNDP measures have a particular purpose - international comparisons - and thus focus on a very limited number of measures which are likely to be endorsed by many

* the HPI is a preliminary step to make countries focus on human development

* further 'local information' - e.g. about what are regarded as the more pressing dimensions in a specific context is available at the country level.

* such information can be used in country studies and in national HDRs

* the HDRs provide a general methodology which can be used to develop further measures which are more relevant to the local level.

Table 3. Comparison of the Borda and HPIn Rankings.

Country	Borda Rank	HPIn	HPIn Rank	Difference
Trinidad and Tobago	72.0	4.1	74.0	-2.0
Cuba	74.0	5.1	73.0	1.0
Costa Rica	73.0	6.6	72.0	1.0
Columbia	71.0	10.7	71.0	0.0
Jordan	64.0	10.9	69.0	-5.0
Mexico	61.0	10.9	69.0	-8.0
Panama	70.0	11.2	68.0	2.0
Thailand	64.0	11.7	66.0	-2.0
Uruguay	68.0	11.7	66.0	2.0
Jamaica	69.0	12.1	65.0	4.0
Mauritius	66.0	12.5	64.0	2.0
United Arab Emirates	67.0	14.9	63.0	4.0
Ecuador	59.0	15.2	62.0	-3.0
Mongolia	52.0	15.7	61.0	-9.0
Zimbabwe	49.0	17.3	60.0	-11.0
China	43.0	17.5	59.0	-16.0
Philippines	50.0	17.7	58.0	-8.0
Dominican Republic	61.0	18.3	57.0	4.0
Libyan Arab Jamayriya	63.0	18.8	56.0	7.0
Sri Lanka	48.0	20.7	55.0	-7.0
Indonesia	39.0	20.8	54.0	-15.0
Syrian Arab Republic	58.0	21.7	53.0	5.0
Honduras	54.0	22.0	52.0	2.0
Bolivia	43.0	22.5	51.0	-8.0
Iran	51.0	22.6	50.0	1.0
Peru	53.0	22.8	49.0	4.0
Botswana	42.0	22.9	48.0	-6.0
Paraguay	60.0	23.2	47.0	13.0
Tunisia	56.0	24.4	46.0	10.0
Kenya	45.0	26.1	45.0	0.0
Viet Nam	34.0	26.2	44.0	-10.0
Nicaragua	47.0	27.2	43.0	4.0
Lesotho	32.0	27.5	42.0	-10.0
El Salvador	56.0	28.0	41.0	15.0
Algeria	54.0	28.6	40.0	14.0
Congo	41.0	29.1	39.0	2.0
Iraq	45.0	30.7	38.0	7.0
Myanmar	28.0	31.2	37.0	-9.0
Cameroon	35.0	31.4	36.0	-1.0

Papua New Guinea	20.0	32.0	35.0	-15.0
Egypt	37.0	34.8	34.0	3.0
Zambia	33.0	35.1	33.0	0.0
Guatamala	36.0	35.5	32.0	4.0
Ghana	31.0	36.2	31.0	0.0
India	18.0	36.7	30.0	-12.0
Togo	23.0	39.3	29.0	-6.0
Tanzania	38.0	39.7	28.0	10.0
Lao	11.0	40.1	27.0	-16.0
Zaire	22.0	41.2	26.0	-4.0
Uganda	30.0	41.3	25.0	5.0
Nigeria	23.0	41.6	24.0	-1.0
Morocco	40.0	41.7	22.0	18.0
Central African Republic	25.0	41.7	22.0	3.0
Sudan	14.0	42.2	21.0	-7.0
Guinea-Bissau	19.0	43.6	20.0	-1.0
Namibia	25.0	45.1	19.0	6.0
Malawi	8.0	45.8	18.0	-10.0
Haiti	16.0	46.2	17.0	-1.0
Cote d'Ivoire	27.0	46.3	15.0	12.0
Bhutan	20.0	46.3	15.0	5.0
Pakistan	16.0	46.8	14.0	2.0
Yemen	9.0	47.6	13.0	-4.0
Bangladesh	12.0	48.3	12.0	0.0
Senegal	29.0	48.7	11.0	18.0
Burundi	9.0	49.0	10.0	-1.0
Madagascar	7.0	49.5	9.0	-2.0
Guinea	6.0	50.0	8.0	-2.0
Mozambique	15.0	50.1	7.0	8.0
Cambodia	4.0	52.5	6.0	-2.0
Mali	12.0	54.7	5.0	7.0
Ethiopia	1.0	56.2	4.0	-3.0
Burkina-Faso	3.0	58.3	3.0	0.0
Sierra Leone	2.0	59.2	2.0	0.0
Niger	5.0	66.0	1.0	4.0

Key:

Borda Rank: Ranking according to the Borda Rule.

HPIIn: Standard Human Poverty Index.

HPIIn Rank: Ranking according to the Standard Human Poverty Index.

Difference: Borda Rank-HPIIn Rank.

Source: United Nations Development Programme (1997).

Table 1. Poverty in 74 Countries

Country	E	L	M	S
Madagascar	32.1	54.2	34.0	3.0
Malawi	38.1	44.2	30.0	6.0
Sierra Leone	52.1	69.7	29.0	11.0
Cambodia	31.9	65.0	40.0	14.0
Zaire	30.0	23.6	34.0	18.0
Burkina-Faso	36.1	81.3	30.0	18.0
Ethiopia	35.7	65.5	48.0	19.0
Guinea	41.3	65.2	26.0	21.0
Sudan	25.2	55.2	34.0	22.0
Papua New Guinea	28.6	28.8	35.0	22.0
Viet Nam	12.1	7.0	45.0	22.0
Togo	28.4	49.6	24.0	23.0
China	9.1	19.1	16.0	24.0
Yemen	25.6	58.9	39.0	24.0
Haiti	27.1	55.9	28.0	24.0
Lao	32.7	44.2	44.0	28.0
Lesotho	23.9	29.5	21.0	28.0
India	19.4	48.8	53.0	29.0
Guinea-Bissau	43.2	46.1	23.0	30.0
Mali	28.4	70.7	31.0	31.0
Egypt	16.6	49.5	9.0	32.0
Namibia	23.1	60.0	26.0	34.0
Paraguay	9.2	8.1	4.0	41.0
Morocco	12.3	57.9	9.0	41.0
Cote d'Ivoire	23.1	60.6	24.0	43.0
Myanmar	25.6	17.0	43.0	43.0
Pakistan	22.6	62.9	38.0	47.0
Bangladesh	26.4	62.7	67.0	48.0
Cameroon	25.4	37.9	14.0	50.0
Indonesia	14.8	16.8	35.0	51.0
Burundi	33.8	65.4	37.0	51.0
Central African Republic	35.4	42.8	27.0	52.0
Mozambique	43.8	60.5	27.0	54.0
Niger	43.2	86.9	36.0	54.0
Ghana	24.6	36.6	27.0	55.0
Bolivia	19.6	17.5	16.0	55.0
Botswana	15.9	31.3	15.0	55.0
Peru	13.4	11.7	11.0	57.0
Nigeria	33.8	44.4	36.0	58.0

Senegal	25.3	67.9	20.0	58.0
Guatemala	14.5	44.3	27.0	59.0
Nicaragua	13.6	34.7	12.0	60.0
Uruguay	5.4	2.9	7.0	61.0
Sri Lanka	7.9	9.9	38.0	63.0
Uganda	39.0	38.9	23.0	64.0
Zambia	35.1	23.4	28.0	64.0
Zimbabwe	18.4	15.3	16.0	66.0
Congo	22.1	26.1	24.0	69.0
Iraq	15.4	43.2	12.0	70.0
Bhutan	33.2	58.9	38.0	70.0
Mexico	8.3	10.8	14.0	72.0
Mongolia	16.0	17.8	12.0	74.0
Ecuador	9.9	10.4	17.0	76.0
Kenya	22.3	23.0	23.0	77.0
Philippines	12.8	5.6	30.0	77.0
United Arab Emirates	3.6	21.4	6.0	77.0
Jordan	9.2	14.5	9.0	77.0
Dominican Republic	10.2	18.5	10.0	78.0
Trinidad and Tobago	5.4	2.1	7.0	79.0
Tunisia	10.5	34.8	9.0	80.0
Iran	11.7	31.4	16.0	81.0
El Salvador	11.7	29.1	11.0	81.0
Panama	6.2	9.5	7.0	83.0
Syrian Arab Republic	10.3	30.2	12.0	83.0
Costa Rica	4.1	5.3	2.0	84.0
Colombia	6.3	8.9	8.0	85.0
Tanzania	30.6	33.2	29.0	86.0
Honduras	10.8	28.0	18.0	87.0
Jamaica	4.3	15.6	10.0	89.0
Algeria	10.6	40.6	13.0	91.0
Cuba	6.2	4.6	1.0	92.0
Thailand	8.9	6.5	26.0	96.0
Libyan Arab Jamahiriya	16.2	25.0	5.0	98.0
Mauritius	6.2	17.6	16.0	99.0

Key:

E: People Not Expected to Survive Beyond Age 40 (%), 1990.

L: Adult Illiteracy Rate (%), 1995.

M: Underweight Children Under Age 5 (%), 1990-96.

S: Proportion of Population with Access to Sanitation (%), 1990-96.

Source: United Nations Development Programme (1997).

Table 1. Poverty in 74 Countries

Country	E	L	M	S
Madagascar	32.1	54.2	34.0	3.0
Malawi	38.1	44.2	30.0	6.0
Sierra Leone	52.1	69.7	29.0	11.0
Cambodia	31.9	65.0	40.0	14.0
Zaire	30.0	23.6	34.0	18.0
Burkina-Faso	36.1	81.3	30.0	18.0
Ethiopia	35.7	65.5	48.0	19.0
Guinea	41.3	65.2	26.0	21.0
Sudan	25.2	55.2	34.0	22.0
Papua New Guinea	28.6	28.8	35.0	22.0
Viet Nam	12.1	7.0	45.0	22.0
Togo	28.4	49.6	24.0	23.0
China	9.1	19.1	16.0	24.0
Yemen	25.6	58.9	39.0	24.0
Haiti	27.1	55.9	28.0	24.0
Lao	32.7	44.2	44.0	28.0
Lesotho	23.9	29.5	21.0	28.0
India	19.4	48.8	53.0	29.0
Guinea-Bissau	43.2	46.1	23.0	30.0
Mali	28.4	70.7	31.0	31.0
Egypt	16.6	49.5	9.0	32.0
Namibia	23.1	60.0	26.0	34.0
Paraguay	9.2	8.1	4.0	41.0
Morocco	12.3	57.9	9.0	41.0
Cote d'Ivoire	23.1	60.6	24.0	43.0
Myanmar	25.6	17.0	43.0	43.0
Pakistan	22.6	62.9	38.0	47.0
Bangladesh	26.4	62.7	67.0	48.0
Cameroon	25.4	37.9	14.0	50.0
Indonesia	14.8	16.8	35.0	51.0
Burundi	33.8	65.4	37.0	51.0
Central African Republic	35.4	42.8	27.0	52.0
Mozambique	43.8	60.5	27.0	54.0
Niger	43.2	86.9	36.0	54.0
Ghana	24.6	36.6	27.0	55.0
Bolivia	19.6	17.5	16.0	55.0
Botswana	15.9	31.3	15.0	55.0
Peru	13.4	11.7	11.0	57.0
Nigeria	33.8	44.4	36.0	58.0

Senegal	25.3	67.9	20.0	58.0
Guatemala	14.5	44.3	27.0	59.0
Nicaragua	13.6	34.7	12.0	60.0
Uruguay	5.4	2.9	7.0	61.0
Sri Lanka	7.9	9.9	38.0	63.0
Uganda	39.0	38.9	23.0	64.0
Zambia	35.1	23.4	28.0	64.0
Zimbabwe	18.4	15.3	16.0	66.0
Congo	22.1	26.1	24.0	69.0
Iraq	15.4	43.2	12.0	70.0
Bhutan	33.2	58.9	38.0	70.0
Mexico	8.3	10.8	14.0	72.0
Mongolia	16.0	17.8	12.0	74.0
Ecuador	9.9	10.4	17.0	76.0
Kenya	22.3	23.0	23.0	77.0
Philippines	12.8	5.6	30.0	77.0
United Arab Emirates	3.6	21.4	6.0	77.0
Jordan	9.2	14.5	9.0	77.0
Dominican Republic	10.2	18.5	10.0	78.0
Trinidad and Tobago	5.4	2.1	7.0	79.0
Tunisia	10.5	34.8	9.0	80.0
Iran	11.7	31.4	16.0	81.0
El Salvador	11.7	29.1	11.0	81.0
Panama	6.2	9.5	7.0	83.0
Syrian Arab Republic	10.3	30.2	12.0	83.0
Costa Rica	4.1	5.3	2.0	84.0
Colombia	6.3	8.9	8.0	85.0
Tanzania	30.6	33.2	29.0	86.0
Honduras	10.8	28.0	18.0	87.0
Jamaica	4.3	15.6	10.0	89.0
Algeria	10.6	40.6	13.0	91.0
Cuba	6.2	4.6	1.0	92.0
Thailand	8.9	6.5	26.0	96.0
Libyan Arab Jamahiriya	16.2	25.0	5.0	98.0
Mauritius	6.2	17.6	16.0	99.0

Key:

E: People Not Expected to Survive Beyond Age 40 (%), 1990.

L: Adult Illiteracy Rate (%), 1995.

M: Underweight Children Under Age 5 (%), 1990-96.

S: Proportion of Population with Access to Sanitation (%), 1990-96.

Source: United Nations Development Programme (1997).

Table 2. Poverty Rankings in 59 Countries.

Country	E	L	M	S	Borda Score	Borda Rank	W-P
Ethiopia	9.0	6.0	3.0	5.0	23.0	1.0	1.0
Sierra Leone	1.0	4.0	17.0	3.0	25.0	2.0	3.0
Burkina-Faso	8.0	2.0	14.0	4.0	28.0	3.0	-2.0
Niger	3.0	1.0	8.0	24.0	36.0	4.0	-1.0
Madagascar	14.0	15.0	12.0	1.0	42.0	5.0	1.0
Guinea	5.0	8.0	25.0	6.0	44.0	6.0	3.0
Malawi	7.0	22.0	14.0	2.0	45.0	7.0	9.0
Mali	17.0	3.0	13.0	13.0	46.0	8.0	-4.0
Burundi	12.0	7.0	7.0	21.0	47.0	9.0	-2.0
Bangladesh	20.0	10.0	1.0	19.0	50.0	10.0	-2.0
Pakistan	25.0	9.0	5.0	18.0	57.0	11.0	10.0
Mozambique	2.0	12.0	21.0	24.0	59.0	12.0	0.0
India	29.0	18.0	2.0	11.0	60.0	13.0	0.0
Haiti	19.0	14.0	19.0	10.0	62.0	14.0	0.0
Guinea-Bissau	3.0	19.0	28.0	12.0	62.0	14.0	-3.0
Papua New Guinea	16.0	33.0	10.0	7.0	66.0	16.0	-6.0
Nigeria	12.0	20.0	8.0	29.0	69.0	17.0	-2.0
Togo	17.0	16.0	27.0	9.0	69.0	17.0	3.0
Central African Republic	10.0	23.0	21.0	23.0	77.0	19.0	-1.0
Cote d'Ivoire	24.0	11.0	27.0	17.0	79.0	20.0	-3.0
Senegal	22.0	5.0	33.0	29.0	89.0	21.0	-2.0
Uganda	6.0	25.0	28.0	35.0	94.0	22.0	2.0
Ghana	23.0	27.0	21.0	26.0	97.0	23.0	4.0
Zambia	11.0	36.0	19.0	35.0	101.0	24.0	-1.0
Viet Nam	39.0	54.0	4.0	7.0	104.0	25.0	0.0
Indonesia	33.0	43.0	10.0	21.0	107.0	26.0	3.0
Cameroon	21.0	26.0	40.0	20.0	107.0	26.0	4.0
Guatemala	34.0	21.0	21.0	31.0	107.0	26.0	-4.0
Egypt	31.0	17.0	49.0	14.0	111.0	29.0	5.0
Morocco	38.0	13.0	49.0	15.0	115.0	30.0	1.0
Tanzania	15.0	30.0	17.0	54.0	116.0	31.0	-3.0
Congo	27.0	35.0	27.0	38.0	127.0	32.0	-6.0
Bolivia	28.0	42.0	36.0	26.0	132.0	33.0	9.0
Kenya	26.0	37.0	28.0	42.0	133.0	34.0	-1.0
Nicaragua	35.0	29.0	43.0	32.0	139.0	35.0	-3.0
Sri Lanka	51.0	50.0	5.0	34.0	140.0	36.0	-1.0
Zimbabwe	30.0	45.0	36.0	37.0	148.0	37.0	2.0
Philippines	37.0	56.0	14.0	42.0	149.0	38.0	-1.0
Mongolia	32.0	40.0	43.0	40.0	155.0	39.0	-1.0
Peru	36.0	47.0	45.0	28.0	156.0	40.0	0.0
Iran	40.0	31.0	36.0	49.0	156.0	40.0	5.0
Honduras	42.0	34.0	34.0	55.0	165.0	42.0	-1.0
Algeria	43.0	24.0	42.0	57.0	166.0	43.0	1.0
El Salvador	40.0	32.0	45.0	50.0	167.0	44.0	-8.0
Tunisia	44.0	28.0	49.0	48.0	169.0	45.0	2.0
Ecuador	46.0	49.0	36.0	41.0	172.0	46.0	5.0
Paraguay	47.0	53.0	58.0	15.0	173.0	47.0	1.0
Dominican Republic	45.0	39.0	47.0	46.0	177.0	48.0	4.0
Mexico	50.0	48.0	40.0	39.0	177.0	48.0	-2.0
Jordan	47.0	46.0	49.0	42.0	184.0	50.0	-1.0
Thailand	49.0	55.0	25.0	58.0	187.0	51.0	-9.0
Mauritius	53.0	41.0	36.0	59.0	189.0	52.0	-2.0
United Arab Emirates	59.0	38.0	57.0	42.0	196.0	53.0	4.0
Uruguay	55.0	58.0	56.0	33.0	202.0	54.0	2.0
Jamaica	57.0	44.0	47.0	56.0	204.0	55.0	-2.0
Panama	53.0	51.0	54.0	51.0	209.0	56.0	-1.0
Columbia	52.0	52.0	53.0	53.0	210.0	57.0	-3.0
Trinidad and Tobago	55.0	59.0	54.0	47.0	215.0	58.0	0.0
Costa Rica	58.0	57.0	59.0	52.0	226.0	59.0	0.0

Key:

E: People Not Expected to Survive Beyond Age 40 (%), 1990.

L: Adult Illiteracy Rate (%), 1995.

M: Underweight Children Under Age 5 (%), 1990-96.
S: Proportion of Population with Access to Sanitation (%), 1990-96.
R: Combined Enrolment Ratio (%), 1994
C: Consumption (US \$ PPP), 1994.
Borda Score= E+L+M+S+R+C
Borda Rank: Ranking According to the Borda Rule.
W-P: Well-Being Rank - Poverty Rank.

Source: United Nations Development Programme (1997).