Journal of Human Development
A Multi-Disciplinary Journal for People-Centered Development
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713431425

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To link to this article: DOI: 10.1080/14649880600815917
URL: http://dx.doi.org/10.1080/14649880600815917

Journal of Human Development
Vol. 7, No. 3, November 2006

Human Development: Beyond the Human Development Index

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Abstract The well-known Human Development Index (HDI) encompasses only three rather basic aspects of human welfare. This paper aims to go beyond this, by identifying 11 categories of human development. We next propose plausible candidates as indicators of these categories. We then estimate correlations among the indicators within each category, discarding those that are highly correlated with others. This left 39 indicators to encompass the categories. Of these, eight indicators are highly correlated with the HDI and may therefore be represented by it. But 31 are not highly correlated, suggesting that a full assessment of human development requires a much broader set of indicators than the HDI alone. Following the same procedure, we find that under-five mortality rates perform equally as well as the HDI, and income per capita is less representative of other dimensions of human development. The HDI (and the other two broad indicators) are shown to be worse indicators of the extended categories of human development for OECD countries than for developing countries.

Key words: Human development, Economic growth, Comparative country studies

Introduction

Human development (HD) goes well beyond the Human Development Index (HDI), with which it is often equated. HD has been defined as ''a process of enlarging people's choices. The most critical ones are to lead a long and healthy life, to be educated, and to enjoy a decent standard of living. Additional choices include political freedom, guaranteed human

ISSN 1464-9888 print/ISSN 1469-9516 online/06/030323-36
DOI: 10.1080/14649880600815917

rights and self-respect'' (United Nations Development Programme [UNDP], 1990, p. 10). The HDI itself is clearly a reductionist measure, incorporating just a subset of possible human choices. In fact, the measure, which includes life expectancy, literacy, years of education, and a modified measure of income, is directed at the choices referred to as 'most critical' in the first *Human Development Report* of the UNDP (1990).

It has long been recognized that the HDI is, therefore, a very incomplete measure of HD, leaving out many aspects of life that are of fundamental importance. The aim of this paper is to identify a wider set of measures of choices that might qualify as part of HD, and to analyze how well or poorly the more extensive list of choices is in practice represented by the HDI, using international cross-country data.

Our first task is to identify which aspects of life might reasonably qualify as part of HD. To do this, we survey a few of the many attempts that have been made to define the full life; although these generally have different philosophical underpinnings, they are in broad agreement about the main dimensions to be included. In the light of this, we draw up a list of the categories of life we feel are good candidates to be included as part of HD. Having identified the main categories we wish to include as dimensions of HD, we then try to identify indicators of performance in each of the categories, bearing in mind both measurability and data availability. For each category, we then explore the relationships among the indicators, aiming to identify a single indicator (or a few indicators) to represent each category. We then estimate how well these representative indicators correlate across countries with the widely accepted measures of progress, including the HDI, income per capita (PPP) and the under-five mortality rate. This enables us to see whether adopting a broader concept of HD requires a wider set of indicators than the HDI. In so far as it does, this should permit improved measurement of progress, of country comparisons, as well as of analysis and policy choices. Our aim is not to be definitive, but to explore whether extending the concept and measurement of HD to a broader set of dimensions seriously affects the way one should measure and assess country performance.

HD concerns potential achievement (i.e. choices), following Sen's capabilities approach (Sen, 1999). We should note that, as in most attempts to assess HD, and indeed capabilities, we can only observe actual achievements rather than the range of *ex ante* choices available. The actual set of achievements on any variable, of course, indicates that it is a member of the set of possible choices, but the range of choices presumably goes much beyond actual performance, as options *not* chosen are not included.

Defining the full life, or a broad definition of human development

Defining what makes for a full life has been a central theme of philosophers and politicians throughout history. Aristotle's *Ethics*, for

example, was devoted to identifying the conditions needed to achieve *eudaimonia*, commonly interpreted as ''the best life'' (Bostock, 2000, p. 15). Alkire (2002) provides lists produced in 39 attempts to identify what makes for a flourishing life over the years 1938–2000. Here we will consider six (Table 1),[1] each of which adopts a different philosophical approach and justification:

- Rawls identifies primary goods through 'deliberative rationality'. According to *The Theory of Justice*, primary goods ''are in general necessary for the framing and execution of a rational plan of life'', ''following full deliberative rationality, that is, with careful consideration of the relevant facts and after a careful consideration of the consequences'' (Rawls, 1999, pp. 359, 380). They are derived from 'some general facts about human wants and abilities' and the necessities of social interdependence.[2]
- Finnis' approach is derived from practical reasoning (Finnis, 1980; Finnis *et al*., 1987), which has a lot in common with 'deliberative rationality', as it is derived from ''critical reflection about the planning of one's life'' (Nussbaum 2000, p. 79); or the ''internal reflection of each person upon her own thoughts, reading, imagination and experiences'' (Nussbaum, 2000, p. 39, and Table 3.2, pp. 110–111).
- Doyal and Gough's definition of basic needs is based on the principle of 'the avoidance of serious harm', where harm is defined as preventing people realizing activities that are essential to their plan of life (Doyal and Gough, 1991).
- Nussbaum's list is developed on the basis of what is termed 'overlapping consensus' (a concept developed by Rawls (1993) as a basis for justice in a plural society) plus intuition as to what is needed to be 'truly human' (Nussbaum, 2000).[3] An overlapping consensus is an informed view of what people agree about, even with different overall philosophies or religions.
- The *Voices of the Poor* analyses (Narayan-Parker, 2000) represent what the poor identify as their needs, based on focus groups of poor people carried out around the developing world.
- A similar exercise is being conducted by the ESRC Research Group of Well-being in Developing Countries (Camfield, 2005), in which people are consulted as to what makes for a good quality of life in four countries.

Broadly, these efforts reflect two approaches: some aim to identify the *constitutive elements* of a good or flourishing life (e.g. Aristotle and Finnis *et al*.), while others are concerned primarily with the *necessary requirements* of such a life (e.g. Doyal and Gough, and Rawls in relation to primary goods). This is one reason why the six sets of requirements for human flourishing are not in total agreement — those looking at the constitutive requirements of a good life place less emphasis on material

Table 1. Requirements for human flourishing

	Rawls (1972)	Finnis, Boyle and Grisez (1987)	Doyal and Gough (1991)	Nussbaum (2000)	Narayan-Parker (2000)	Camfield (2005)
Defining concepts	Primary goods	Basic human values	**Basic Needs** and Intermediate Needs[a]	Central human functional capabilities	Dimensions of well-being	Quality of life
Bodily well-being		Bodily life —health, vigor and safety	**Physical health** • Nutrition: food and water • Health care • Safe birth control and child-bearing • Safe Physical environment	Life Bodily health Bodily integrity	Bodily well-being Access to health services Good physical environment	
Material well-being	Income and wealth		Protective housing Economic security		Material well-being Food Assets	Food Shelter
Mental development		Knowledge Practical reasonableness	Basic education	Senses Imagination Thought Emotions Practical reason Play		Education (Bangladesh and Ethiopia, not Thailand or Peru)
Work	Freedom of occupation	Skillful performance in work and play	Work		Work	

Table 1. *(Continued.)*

	Rawls (1972)	Finnis, Boyle and Grisez (1987)	Doyal and Gough (1991)	Nussbaum (2000)	Narayan-Parker (2000)	Camfield (2005)
Security			Physical security		Civil peace Physically safe environment Lawfulness (access to justice) Personal physical security Security in old age	
Social relations	Social bases of self-respect	Friendship	Significant primary relationships	Affiliation Social bases for self-respect	Social well-being • Family • Self-respect and dignity • Community relations	Family
Spiritual well-being		Self-integration Harmony with ultimate source of reality				Religion (important in Bangladesh and Thailand)
Empowerment and political freedom	Rights, liberties, opportunities Powers and prerogatives of office and positions of responsibility Freedom of movement		**Autonomy of agency** Civil and political rights Political participation	Control over one's environment	Freedom of choice and action	
Respect for other species				Other species		

Source: Derived from Alkire (2002), Doyal and Gough (1991), Narayan-Parker (2000), and Camfield (2005). a. Intermediate Needs are instrumental for the achievement of Basic Needs — **Basic Needs** are in bold and Intermediate Needs are in normal type.

aspects, while those exploring the necessary requirements for such a life tend to emphasize material aspects more. For example, Finnis *et al.* and Nussbaum are quite thin on material aspects, but emphasize non-material aspects such as friendship and emotions, which are given little or no emphasis by others. Environmental issues appear explicitly in Nussbaum, while they are neglected or discussed briefly by others. Nussbaum is the only author to record 'respect for other species' as a significant dimension.

It is not our aim here to select among these lists (or characteristics), but rather to identify a comprehensive view of the dimensions of HD. People/societies may or may not choose to promote all aspects identified, and we do not wish to make the choices for them. Hence, as a starting point, the relevant set of dimensions is the set that includes all elements that have been identified as possible aspects of human flourishing. The aim, then, is to try to measure country achievements on these manifold dimensions. There are obvious problems with such measurement, including, first, identifying what a good measure of each dimension would ideally be, and then finding what (normally imperfect) measures are available in practice. The latter varies across societies. To make the measurement issue easier, we first draw up a comprehensive set of broad categories to use as a starting point to search for indicators of achievement. For example, we identify 'community well-being' as an important category of HD; then, as indicators of this elusive concept, we include measures of 'crime rate', 'alcohol use', 'corruption', 'orphan rate', 'AIDS deaths', 'membership in civic associations', 'trust in others', 'rule of law', 'confidence in public institutions', 'tolerance of neighbors' and 'natural disaster rates'.

It is useful to start with the broad dimensions first, because objectives of human development are generally thought of in this way rather than more detailed and measurable indicators, as suggested by our list of constituent elements of human flourishing indicated in Table 1. Secondly, while there may be agreement on these broad categories, there is not necessarily the same agreement on selection of more narrowly defined and measurable ways of fulfilling the broad categories. For example, we may agree that political freedom and political participation are important dimensions of HD, but this does not imply a precise form of government and constitution. Thirdly, the best ways of achieving progress in broad categories may vary across countries according, for example, to the level of development or geography. Fourthly, partly for this reason, data availability varies across countries (i.e., each country may have data on some indicators relevant to any single broad category, but not others).

In the light of the efforts to identify dimensions of human flourishing just cited, we propose the following broad categories of HD:

1. The HDI itself. This broadly covers bodily well-being, material well-being and mental development. Of course, it itself is a

multidimensional indicator. We include it as a single indicator because it is the generally accepted measure of achievement on HD.
2. Mental well-being.
3. Empowerment.
4. Political freedom.
5. Social relations.
6. Community well-being.
7. Inequalities.
8. Work conditions.
9. Leisure conditions.
10. Political security.
11. Economic security.
12. Environmental conditions.

In contrast to the categories of Table 1, we have not included spiritual well-being, given problems of definition and measurement, nor have we included respect for other species, although we do consider environmental sustainability. On the other hand, we have separated social relations from community well-being. The former is a matter of people individually having satisfactory relations with others, including such measures as divorce rates, the importance of family and friends, and tolerance for different types of neighbors. The latter, in turn, is a function of the well-being of a community as a whole and includes such elements as low crime rates and a thriving civil society. We have also separated empowerment from political freedom, as the former relates to the power (or lack of it) of the relatively disempowered, such as poor people and women, while the latter relates to liberal political conditions more generally. We have added inequalities as a general category, which in principle should measure inequalities in the other categories. We do this because the existence of various inequalities independently affects people's well-being, especially that of the poor. We also have two conditions to represent security, or the absence of risks to people's HD; one encompasses political security (or freedom from risk of political violence), and the other encompasses economic security (or freedom from risk of loss of livelihood through various vicissitudes).

Any list of categories is inevitably both subjective and ethnocentric both with respect to the broad categories and, even more, to the weight accorded to each. Some of these differences are illustrated, for example, by the variations found across countries and generations in how people define the quality of life by the 'Well-being in Developing Countries' Research Centre (Camfield, 2005). Hence, anyone finding this type of approach helpful should be able to amend the categorization to reflect different views. This applies especially across different cultures.

Selection of indicators and procedures for their use

Ideally, there would seem to be many potential measures for each of the broad categories. In practice, there are difficulties. In the first place, some of the categories of HD are in principle difficult to measure (e.g. mental well-being). Some data are based on surveys of achievements and some on perceptions of observers, with the latter involving an obvious element of subjectivity. In addition, data are often unavailable, or seriously incomplete, covering only a small sample of countries. Some indices are themselves constructed out of a variety of elements and sources in ways that might be subject to challenge. Thus we are aware of the limitations and pitfalls of data in this field. What we have done is to collect whatever we could find; hence our choice of indicators is to a certain extent dictated by data availability. Additional efforts to improve data are clearly warranted. Table 2 presents our initial set of categories and indicators. We should note that some of the indicators represent achievements on the chosen category, while others represent failure (e.g. with respect to mental well-being, life satisfaction is a measure of achievement and suicide a measure of failure) — and the data, of course, need to be interpreted accordingly. Moreover there are overlaps among our categories — for example, 'union density' could pertain both to empowerment and to work conditions, and 'natural disasters' to both community well-being and environmental well-being — but we try to place indicators in the category where they add the most new information. One indicator — tolerance for neighbors — was felt to characterize both social relations and community well-being in equal measure and was included in both categories.

Our basic purpose is to identify a set of indicators that broadly represent the more all-encompassing version of HD, covering the categories identified above. For this, we need to know how far existing core indicators already achieve this. We shall therefore correlate representative indicators of each category with what we call the three core indicators. These core indicators are those commonly used to assess country performance: HDI, PPP per-capita income, and under-five mortality rates. The HDI, as noted, represents a reductionist measure of human development, incorporating basic aspects of health, education and material well-being. Income per capita is, of course, the most common way of assessing overall country performance, used in particular by the World Bank. We have also chosen under-five mortality, used by UNICEF as a way of assessing country performance, for two reasons: one is that we want to be able to focus on health alone as is often advocated (instead of as part of a composite in the form of the HDI); and, secondly, we prefer under-five mortality to life expectancy because it is a much more accurate measure of changes over time, while encompassing a wider concept of health than the infant mortality rate, which is often used. We are using all three indicators in spite of the fact that they are highly correlated with each other because we wish to investigate whether different core indicators are better or worse at representing a wider range of categories of HD.

Table 2. Categories and indicators

Mental well-being	Empowerment	Political freedom	Social relations	Community well-being	Inequality	Work conditions	Leisure conditions	Economic stability	Political security	Environmental conditions
Male suicide rate	Poverty rates: • $1 a day • national • HPI	Political and civil liberties	Friends very important	Crime rate	Income Gini	Unemployment	Telephone availability	GDP cycle	Political stability	Environmental sustainability index
Female suicide rate	GEM	Freedom of worship	Family very important	Alcohol use	Horizontal Inequalities	Employment conditions	Internet use	CPI fluctuations	Refugee flows	
Life satisfaction	Female/male secondary education enrolment	Political terror index	Tolerance of neighbors	Corruption	Rural/urban inequality	Informal employment	Radio use	Manufactured/ total exports	Collective violence	
Prisoners/ population	Unmet need for contraceptives	Political freedom	Crude divorce rate	Orphan rate	GDI	Child labor	Cinema attendance	Foreign portfolio investment/ GDP	Political violence	
	Married girls, 15–19	Freedom of the press		AIDS deaths	Happiness inequality	Minimum wage policy	Newspaper circulation	Terms of trade fluctuations		
	Ratio of females in parliament	Juridical independence		Membership in civic associations	Health inequality		Television ownership	Social security coverage		
	Union density			Trust in others						
				Rule of law						
				Public institutions						
				Population affected by natural disasters						
				Tolerance of neighbors						

Source: See Appendix 1 for full details of the data-set.

In exploring each category we have two objectives: first, to examine the relationships among the variables within each set, which we will do by calculating rank-order correlations among them across developing country performance for the same time period. Secondly, we aim to identify variables that would be appropriate to represent each category as a whole so that we can determine how the categories relate to HDI and the two other core measures of country performance. The second objective depends on the first in the sense that, where variables are strongly and significantly related to each other, we select just one to represent the set of highly correlated variables. Where variables in a particular category are not highly correlated with each other, we choose more than one variable to represent the category.

We decided on a number of rules of procedure. When the sample size for an indicator is 25 or less, we do not select that variable as one of the indicators representing the category. We define the rank-order correlation as being 'very high' when the correlation coefficient is above 0.8; 'high' when the correlation coefficient is 0.6 and over, and below 0.8; 'moderate' when it is 0.3 and over, and below 0.6; and low when it is below 0.3. In determining which variables represent others because of high intercorrelation, we take 0.6 and above as our requirement. Only significant correlations (at the 5% level) are counted and all statements about correlations refer only to significant ones.

To select which of two or more variables that are correlated at the required level is chosen to represent the category, we first consider which variable 'carries' (i.e. is correlated at the required rate) most other variables. When they are equal, we consider which variable shows the greater level of correlation with the other variables. Obviously, these rules of procedure are somewhat arbitrary. However, it is relatively easy to test whether and how far our results would vary by changing them. The broad conclusions do not seem to vary with changes (e.g. in the cut-off rate of the correlation coefficient), but the details would.

An alternative procedure would have been to adopt principal components analysis, which has been widely used in similar types of work (see, for example, Schokkaert and van Ootegem, 1990; McGillivray, 2005); however, our initial experiments with this procedure suggest several theoretical and technical shortcomings, in part relating to the structure of our data. First, the purpose of factor analysis is to identify the commonalities within a set of data, while our concern is also to consider the uniqueness within each category. Second, we found that each extracted factor explained very different amounts of variance depending on the category, thereby impeding comparison between them. Third, the technique only included countries in each category for which all data were available, which at times drastically reduced our sample size and omitted significant amounts of relevant information. Finally, the method imposes linear relationships between variables (it is based on a Pearson's matrix), which we felt was too constraining. While we may experiment further with

factor analyses in future work, our analysis to date suggests the method might not be optimal for the purpose here.[4]

Correlations within the categories

Adopting the procedures already outlined, we obtain the following results.

Mental well-being

Our mental well-being indicators (Table 3) cover measures of unhappiness, as shown by suicide, lack of adjustment to society as shown by the prison population, and life satisfaction.

Of the indicators available, male and female suicide are highly correlated, and neither is correlated with the other variables (i.e. a measure of life satisfaction, unhappiness and prisoners per population). It is therefore not particularly important which we select, but we choose the male suicide rate given that deaths by suicide are more common among men than women (Payne and Lart, 1999). The other variables — life satisfaction and prisoners — are not significantly related to each other. We therefore select life satisfaction, prisoner population and male suicide as independent indicators of mental well-being.

Empowerment

Empowerment and political freedom are clearly related. However, our interpretation of 'empowerment' is particularly concerned with the ability of relatively weak groups in society to be autonomous and take control over their lives, while political freedom relates primarily to formal societal political

Table 3. Mental well-being indicators

	MaleSuicide	FemaleSuicide	LifeSatisfaction	Prisoners
MaleSuicide	1			
	44			
FemaleSuicide	0.8632*	1		
	0			
	44	46		
LifeSatisfaction	−0.0403	−0.0228	1	
	0.874	0.926		
	18	19	30	
Prisoners	0.2588	0.0536	0.2881	1
	0.0898	0.7235	0.1226	
	44	46	30	124

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second line presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

liberties and is treated separately. Our empowerment indicators cover various measures of poverty, as economic poverty is disempowering, and of the status of females, as well as a measure of unionization (see Table 4).

The $1 a day poverty rate is highly correlated with national poverty rates, the Human Poverty Index (HPI) and the share of girls aged 15–19 years who are married, while the other poverty indices are highly correlated with fewer variables within the category. Therefore, following our procedures, we adopt the $1 a day poverty rate as an indicator for this category.

The Gender Empowerment Measure (GEM) is highly correlated with female parliamentarians. We choose the GEM because it represents a wider range of female empowerment. The ratio of female to male secondary education is not highly correlated with any other variable, although it is moderately (negatively) correlated with the poverty measures and the rate of teenage marriage, and (positively) with the unmet need for contraceptives. The rate of union density is not correlated with any of the other variables, while unmet need for contraceptives is not highly correlated with other variables in the category. Consequently, we choose the $1 a day poverty rate, GEM and female/male secondary education, the unmet need for contraceptives and union density as representing the empowerment category.

Political freedom

As indicators for political freedom (see Table 5) we have chosen two composite indicators, 'political rights and civil liberties', produced by Freedom House, and 'political freedom', prepared by the World Bank, and distinct indicators of political terror (Amnesty International), freedom of worship (Freedom House), and free press and juridical independence (World Economic Forum). Both 'political and civil liberties' and 'political freedom' are highly correlated with each other, and with free worship and freedom of the press, and therefore can be used to represent them. There is not much to choose between the two, therefore, but we select political and civil liberties as its correlation with free press is slightly higher. Political terror and juridical independence are not highly correlated with any other variables and we select them as well.

Social relations

This is an area where information is particularly scarce and available samples are small. We have indicators for values placed on friends and family, tolerance for different types of neighbors, as well as the divorce rate (Table 6). The crude divorce rate is moderately (negatively) correlated with the importance of families, but there are no high correlations among the variables. We therefore retain all four variables — the value placed on families, value placed on friends, neighbor tolerance and the divorce rate — to represent this category.

Table 4. Empowerment indicators

	Poverty1day	PovNational	HPI	GEM	SecFemMale	ContraceptiveLack	MarriedGirls	FemParliamnt	UnionDensity
Poverty1day	1								
	70								
PovNational	0.7271*	1							
	0	70							
HPI	0.7350*	0.5392*	1						
	0	0	94						
GEM	−0.0537	−0.1712	−0.5318*	1					
	0.7742	0.4133	0.0014						
	31	25	33	40					
SecFemMale	−0.4073*	−0.3535*	−0.5831*	0.2623	1				
	0.003	0.0101	0	0.1403					
	51	52	68	33	92				
ContraceptiveLack	−0.5883*	−0.3245*	−0.7539*	−0.0647	0.5799*	1			
	0	0.0156	0	0.7864	0				
	52	55	64	20	53	79			
MarriedGirls	0.6264*	0.5937*	0.5498*	−0.3393*	−0.5017*	−0.5033*	1		
	0	0	0	0.0322	0	0			
	70	68	86	40	83	68	112		
FemParliamnt	−0.0073	−0.0436	−0.1283	0.8685*	0.1957	0.0815	−0.1051	1	
	0.9519	0.7202	0.228	0	0.0692	0.4838	0.2882		
	70	70	90	40	87	76	104	127	
UnionDensity	−0.0453	−0.145	0.0015	0	0.2097	0.076	−0.2508	0.1016	1
	0.8023	0.4616	0.9936	1	0.3253	0.7368	0.1462	0.5615	
	33	28	32	19	24	22	35	35	36

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second line presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

Table 5. Political freedom indicators

	PolrtCivlib	FreeWorship	PolTerror	PolFreedom	FreePress	JuridIndp
PolrtCivlib	1					
	137					
Freeworship	0.7951*	1				
	0					
	39	39				
PolTerror	0.3420*	0.1728	1			
	0.0002	0.2996				
	111	38	111			
PolFreedom	−0.9351*	−0.7942*	−0.4492*	1		
	0	0	0			
	136	39	111	136		
FreePress	0.7526*	0.5551*	0.251	−0.6894*	1	
	0	0.0027	0.0621	0		
	61	27	56	61	61	
JuridIndp	0.2096	0.3264	0.3106*	−0.4378*	0.1856	1
	0.1049	0.0966	0.0198	0.0004	0.1522	
	61	27	56	61	61	61

Source: See Appendix 1.
Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

Community well-being

We have a wide variety of potential indicators here (see Table 7). There are only small samples for trust in others, the crime rate, and the share of the population involved in civic work; therefore, for the moment, we drop them. AIDS deaths are highly correlated with the rate of orphans. AIDS

Table 6. Social relations indicators

	FriendsVeryImpt	FamilyVImpt	NgbTol	CrudeDivorce
FriendsVeryImpt	1			
	75			
FamilyVimpt	0.3563*	1		
	0.0017			
	75	75		
NgbTol	−0.0388	0.1856	1	
	0.7464	0.1185		
	72	72	73	
CrudeDivorce	−0.1367	−0.3792*	−0.2633	1
	0.3489	0.0072	0.0771	
	49	49	46	68

Source: See Appendix 1.
Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

Table 7. Community well-being indicators

	Crime	Alcohol	Corruption	Orphans	AIDS	CivicWork	Trust	RuleofLaw	PublicInst	NatDisaster	NgbTol
Crime	1										
	17										
Alcohol	0.4893*	1									
	0.0462										
	17	128									
Corruption	0.0847	0.2089*	1								
	0.7466	0.0469									
	17	91	93								
Orphans	−0.1121	−0.04	−0.4405*	1							
	0.6907	0.7047	0.0001								
	15	92	70	93							
AIDS	0.1149	0.0974	−0.4777*	0.7162*	1						
	0.6718	0.3532	0	0							
	16	93	77	84	94						
CivicWork	0.2857	0.5242	0.1956	0.1242	−0.1736	1					
	0.5345	0.0543	0.5028	0.7006	0.5707						
	7	14	14	12	13	14					
Trust	−0.4	−0.4856*	−0.2464	0.2721	−0.0904	−0.2187	1				
	0.2861	0.0139	0.2351	0.2458	0.6967	0.5183					
	9	25	25	20	21	11	25				
RuleofLaw	−0.1495	0.1223	0.8879*	−0.4519*	−0.4707*	0.0396	−0.0131	1			
	0.5668	0.1691	0	0	0	0.893	0.9505				
	17	128	93	93	94	14	25	134			
PublicInst	0.05	0.1585	0.8866*	−0.1665	−0.3060*	0.1963	−0.0805	0.8229*	1		
	0.8541	0.2265	0	0.2528	0.0244	0.5013	0.7086	0			
	16	60	61	49	54	14	24	61	61		
NatDisaster	−0.1054	0.0117	−0.2887*	0.1217	0.1899	−0.0485	0.2936	−0.1526	−0.4470*	1	
	0.6873	0.8958	0.0052	0.2453	0.0683	0.8693	0.1544	0.0806	0.0003		
	17	128	92	93	93	14	25	132	60	134	
NgbTol	−0.5394	0.0981	0.0764	0.215	−0.0185	−0.2421	−0.0574	0.1006	0.2162	−0.2679	1
	0.1076	0.6059	0.6935	0.3245	0.9301	0.4255	0.79	0.597	0.2691	0.1523	
	10	30	29	23	25	13	24	30	28	30	30

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

deaths represent a more comprehensive condition, and are a cause of the high orphan rates and of other problems in society, so we choose it. The public institutions variable is highly correlated with the rule of law and the rate of corruption. We chose that to represent these two variables, since the latter two were only highly correlated with one other variable. The three variables—rule of law, public institutions and corruption—are all highly intercorrelated, with little to choose among them. We choose the rule of law (a World Bank measure of the extent to which agents have confidence in the rules of society and abide by them) as a more comprehensive indicator than the other two. The share of the population involved in natural disasters was not highly correlated with any of the other indicators, nor was tolerance of neighbors. Consequently, we selected AIDS deaths, the rule of law, tolerance of neighbors and the rate of natural disasters as representative of community well-being.

Inequalities

Of the various measures of inequality (Table 8), the Gender—related Development Index (GDI) (the UNDP's composite measure of gender inequality) is very highly correlated with happiness inequality (a measure of the dispersion of 'life satisfaction'). We select the GDI because it encompasses a broader set of variables. While health inequality is moderately correlated with the income Gini, the correlation is not high enough to allow us to eliminate either indicator, as is also the case with rural–urban inequality and

Table 8. Inequality indicators

	IncomeGini	HI	RurUrbIneq	GDI	HappyIneq	HealthIneq
IncomeGini	1					
	78					
HI	0.1803	1				
	0.1719					
	59	78				
RurUrbIneq	−0.2788	−0.4065*	1			
	0.0577	0.0125				
	47	37	48			
GDI	−0.1016	−0.0646	0.0136	1		
	0.3824	0.5795	0.9268			
	76	76	48	122		
HappyIneq	−0.1307	−0.151	0.0572	0.9982*	1	
	0.2844	0.212	0.7189	0		
	69	70	42	111	111	
HealthI-	0.2950*	0.2248	−0.0305	−0.0186	−0.0775	1
neq	0.0288	0.1127	0.8579	0.8881	0.574	
	55	51	37	60	55	61

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

horizontal inequality (HI) (i.e. inequality between groups). Consequently, we select the income Gini, HI, rural/urban inequality, GDI and health inequality to represent their category.

Work conditions

We have five indicators of work conditions (Table 9): the unemployment rate at a recent date, child labor (5–14), an index of employment conditions reflecting the regulatory situation, informal employment as a proportion of the total, and an index indicating the existence of a minimum wage policy. Child labor is inversely correlated with the unemployment rate, although there are only 12 cases of countries with both sets of data. We retain unemployment because the indicator is available for a much larger number of countries. However, it is well known that data for this (as well as for child labor) are unreliable and variable, since definitions differ markedly across countries. Since none of the other indicators are highly correlated with each other, although there is a moderate correlation between minimum wage policy and employment conditions, we retain the remaining three variables — informal employment, minimum wage policy and employment conditions — as well as the unemployment rate to represent the work conditions category.

Leisure conditions

We have six variables in this category (Table 10): telephone availability, Internet use, radio use, television ownership, newspaper use per person,

Table 9. Work conditions indicators

	Unemployment	EmplConditions	InformalEmpl	ChildLabor	MinWagePol
Unemployment	1				
	67				
EmplConditions	−0.0391	1			
	0.7964				
	46	76			
InformalEmpl	0.192	0.14	1		
	0.4452	0.4862			
	18	27	28		
ChildLabor	−0.7881*	0.1617	−0.0387	1	
	0.0023	0.4401	0.9002		
	12	25	13	41	
MinWagePol	0.0279	0.3922*	0.2263		1
	0.8755	0.0085	0.2468	1	
	34	44	28	16	47

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

Table 10. Leisure conditions indicators

	PhoneAvail	InternetUse	RadioUsage	CinemaAtt	Newspaper	Television
PhoneAvail	1					
	135					
InternetUse	0.9064*	1				
	0					
	134	134				
RadioUsage	0.7235*	0.6928*	1			
	0	0				
	130	129	130			
CinemaAtt	0.5078*	0.4712*	0.3717*	1		
	0.0022	0.0049	0.0304			
	34	34	34	34		
Newspaper	0.8204*	0.8067*	0.6766*	0.4299*	1	
	0	0	0	0.0284		
	67	66	67	26	67	
Television	0.8249*	0.7728*	0.6775*	0.4348*	0.8068*	1
	0	0	0	0.0102	0	
	130	129	128	34	66	130

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

and cinema attendance. The first five are all highly correlated with each other. We choose telephone availability, because the correlations are highest, and cinema attendance (which is moderately related to the other variables) as our indicators for this category.

Economic stability

This category was selected to represent economic risks that individuals face, which is an important aspect of well-being in addition to achievements at one point in time. Variables chosen (Table 11) because they are likely to cause fluctuations in incomes include the share of manufacturing exports (inversely related), portfolio investment as a share of GDP and fluctuations in the terms of trade. We also include the actual GDP business cycle. Individual economic vulnerability is likely to result from these macro-fluctuations and also from fluctuations in the inflation rate, although individual economic insecurity may be reduced by social security coverage. Our data for all these variables are for 1980–2000 except for social security, which relates to 2000. A high correlation was observed between the terms of trade fluctuations and the share of manufacturing exports in output. Since terms of trade fluctuations are likely to have an immediate effect on many people's incomes, we retain it instead of manufacturing exports as a share of total exports. None of the other variables was highly correlated with other variables, although the portfolio

Table 11. Economic insecurity

	GDPcycle	CPIcycle	ManufExpts	Portfolio	TermsofTrade	SocSecPol
GDPcycle	1					
	108					
CPIcycle	0.1137	1				
	0.2944					
	87	92				
ManufExpts	−0.4426*	−0.2529*	1			
	0.0001	0.0389				
	72	67	76			
Portfolio	0.0312	0.1669	0.229	1		
	0.7891	0.1838	0.0866			
	76	65	57	79		
TermsofTrade	0.2117	0.4209*	−0.5989*	0.0224	1	
	0.0577	0.0003	0	0.866		
	81	69	56	59	89	
SocSecPol	0.0201	−0.0815	0.0965	0.5786*	−0.0537	1
	0.8983	0.6266	0.57	0.0002	0.7423	
	43	38	37	36	40	46

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

share of investment and social security polices were moderately positively correlated, presumably because each is higher at higher levels of per capita income. We therefore retain all the other indicators noted earlier.

Political stability

The four indicators in this area (Table 12) are: 'political stability', a composite index reflecting the likelihood of the overthrow of government compiled by the World Bank; net refugee outflows as a proportion of the population 1998–2002 (from UNHCR); an index of collective violence, including excessive civilian targeting (Marshall); and an index for political violence (defined as any type of armed conflict from 1990) (derived from Marshall's data-set). Political stability, collective violence and political violence are all highly intercorrelated. We choose political violence since the correlation coefficients are higher than in the other two cases. The refugee flow indicator is only moderately correlated with the other indicators and is therefore retained as an indicator representing this category.

Environmental conditions

We rely upon just one composite indicator for this category — environmental sustainability — produced by the World Economic

Table 12. Political stability indicators

	PolStability	Refugees	CollViolence	PolViolence
PolStability	1			
	125			
Refugees	−0.4202*	1		
	0.001			
	58	58		
CollViolence	−0.6072*	0.4692*	1	
	0	0.0003		
	109	56	109	
PolViolence	−0.6153*	−0.0407	0.6217*	1
	0	0.7617	0	
	125	58	109	137

Source: See Appendix 1.

Note: The first line presents the correlation measure, the second presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation. Indicators retained to represent the category are shaded.

Forum, Yale Center for Environmental Law and Policy, and CIESIN, which will therefore represent this category. We initially began with a broader range of indicators including greenhouse gas emissions, CFC consumption and CO_2 emission efficiency, all of which were moderately correlated with each other. However, their relative importance and correct interpretation was unclear. Accordingly, we decided it would be most appropriate to rely on a multi-component measure developed by experts at Yale and Colombia universities, which incorporates 121 indicators of various aspects of environmental progress (see Yale Center for Environmental Law and Policy and CIESIN, 2005).

Relating the selected indicators to the core indicators

Now that we have selected indicators to represent each category, we can explore how these relate to the three core measures used to assess country performance for the same period of time — the HDI, income per capita (PPP) and under-five mortality. We start with the HDI, currently the most prominent measure of HD performance. Table 13 shows the correlations between HDI and the 39 retained indicators representing our 11 categories. We then follow similar procedures as before; that is, we eliminate any variable that has a high correlation (i.e. above 0.6) with the core indicator. Life satisfaction, the rate of contraceptive use, the divorce rate, the rule of law, telephone availability and social security policies are all highly positively correlated with the HDI, while $1 a day poverty, AIDS deaths and the rate of child labor are highly correlated negatively. The HDI may therefore represent all these indicators and a broader measure of HD would not need to include them (with the exception of the divorce rate since a higher rate is generally viewed as worse for HD). Table 14

Table 13. Correlations between retained indicators and the HDI

Indicator	HDI ranking	Indicator	HDI ranking	Indicator	HDI ranking
HDI ranking	1	NgbTolerance	−0.1017	InformalEmpl	−0.295
			0.5929		0.1275
	126		30		28
MaleSuicide	0.3041*	CrudeDivorce	0.6764*	MinWagePol	−0.2115
	0.0448		0.0008		0.1535
	44		21		47
LifeSatisfaction	0.6877*	AIDSdeaths	−0.6585*	PhoneAvail	0.8585*
	0		0		0
	30		93		125
Prisoners	0.5817*	RuleofLaw	0.6528*	CinemaAtt	0.5074*
	0		0		0.0019
	117		126		35
Poverty1day	−0.7843*	AlcoholUse	0.2483*	GDPcycle	−0.1127
	0		0.0058		0.2502
	70		122		106
Contraceptive	0.7610*	NatDisaster	−0.3223*	CPIcycle	−0.3413*
	0		0.0003		0.0009
	75		124		92
GEM	0.4555*	IncomeGini	0.0621	Portfolio	0.2466*
	0.0031		0.5891		0.0295
	40		78		78
SecFemMale	0.5666*	HorizIneq (HI)	0.3370*	TermsofTrade	−0.171
	0		0.0033		0.1176
	90		74		85
UnionDensity	0.0606	RurUrbIneq	−0.5379*	SocSecPol	0.6072*
	0.7257		0.0001		0
	36		48		46
PolrtCivlib	−0.2991*	GDI	0.013	Refugees	0.0276
	0.0007		0.8916		0.8428
	126		113		54
PolTerror	−0.2719*	HealthIneq	−0.3866*	PolViolence	−0.4276*
	0.0048		0.0021		0
	106		61		126
JuridIndp	−0.3344*	Unemployment	−0.0266	EnvSustain	0.2553*
	0.0084		0.8309		0.0152
	61		67		90
FriendsVeryImpt	0.1404	ChildLabor	−0.7339*		
	0.4594		0		
	30		39		
FamilyVimpt	−0.1849	EmplConditions	−0.1506		
	0.3281		0.1941		
	30		76		

Source: See Appendix 1.
Note: Retained variables are shaded. The first line represents the correlation measure; the second the significance level; and the third the number of observations for each calculation.

summarizes our results, showing which indicators are retained for each category.

This exercise shows that HDI alone does not encompass many other important dimensions of HD, even on our rather modest requirements of

Table 14. Relationship of indicators to the core measures

Category of human development	Indicators eliminated	Indicators retained
Mental well-being	Life satisfaction	Male suicide rate
		Prisoners
Empowerment	$1 a day poverty	GEM
	Contraceptive access	Fem/male secondary educ.
		Union density
Political freedom	None	Political/civil liberties
		Political terror
		Juridical independence
Social relations	None	Value of friends
		Value of family
		Tolerance of neighbors
		Divorce rate
Community well-being	AIDS deaths	Alcohol consumption
	Rule of law	Natural disasters
		Tolerance of neighbors
Inequalities	None	Income Gini
		Horizontal inequality
		Rural/Urban inequality
		GDI
		Health inequality
Work conditions	Child Labor	Unemployment
		Employment conditions
		Informal sector proportion
		Minimum wage policy
Leisure conditions	Phone availability	Cinema attendance
Economic stability	Social security	GDP cycle
		CPI cycle
		Portfolio investment
		Terms of trade
Political stability	None	Political violence
		Refugee flows
Environment	None	Environmental sustainability

Source: See Appendix 1.
Note: Shaded areas indicate retained indicator.

a 0.6 correlation. For each of the eleven categories, at least one other variable needs to be included in order to assess the overall state of HD, and altogether we add 31 indicators.

We proceed in the same way with per-capita income (PPP). For the most part, the results were the same as for the HDI (Table 15). The differences were as follows:

- In the mental well-being category, life satisfaction was moderately rather than highly correlated with income, so that the three variables — life satisfaction, prisoners and male suicide — would need to be retained.
- In community well-being, in contrast to HDI, AIDS deaths are only moderately correlated with income, and thus should be retained.
- In all the other categories, the same indicators are retained as in the case of the HDI.

Table 15. Correlations between retained indicators and per capita income

Indicator	IncomePPP	Indicator	IncomePPP	Indicator	IncomePPP
IncomePPP	1	NgbTol	−0.129	InformalEmpl	−0.1158
			0.4967		0.5574
	113		30		28
Malesuicide	0.1575	CrudeDivorce	0.6663*	MinWagePol	−0.3431*
	0.3318		0.0025		0.0182
	40		18		47
LifeSatisfaction	0.5540*	AIDSdeaths	−0.5447*	PhoneAvail	0.8708*
	0.0015		0		0
	30		89		113
Prisoners	0.6229*	RuleofLaw	0.6748*	CinemaAtt	0.4968*
	0		0		0.0045
	107		113		31
Poverty1day	−0.7592*	AlcoholUse	0.2718*	GDPcycle	−0.1729
	0		0.0039		0.0822
	70		111		102
ContraceptiveLack	0.6497*	NatDisaster	−0.3084*	CPIcycle	−0.4379*
	0		0.0009		0
	71		112		86
GEM	0.4735*	IncomeGini	0.1911	Portfolio	0.2430*
	0.002		0.0937		0.0383
	40		78		73
FemSecmale	0.5404*	HorizIneq (HI)	0.3487*	TermsofTrade	−0.2962*
	0		0.0027		0.008
	82		72		79
UnionDensity	0.0802	RurUrbIneq	−0.5347*	SocSecPol	0.6419*
	0.642		0.0001		0
	36		48		46
PolrtCivlib	−0.3471*	GDI	−0.0671	Refugees	−0.0677
	0.0002		0.4966		0.6442
	113		105		49
PolTerror	−0.2806*	HealthIneq	−0.4017*	PolViolence	−0.4530*
	0.0059		0.0015		0
	95		60		113
JuridIndp	−0.4524*	Unemployment	0.1517	EnvSustain	0.2990*
	0.0003		0.2354		0.0054
	60		63		85
FriendsVeryImpt	0.0937	ChildLabor	−0.7154*		
	0.6225		0		
	30		38		
FamilyVimpt	−0.1909	EmplConditions	−0.2259		
	0.3123		0.0513		
	30		75		

Source: See Appendix 1.

Thus, the HDI is a somewhat more encompassing general indicator of HD than per-capita income.[5] Income per capita is, of course, also a less good measure of the basic elements of HD than HDI, which is designed for this very purpose. This is confirmed by the stronger correlations of HDI with life expectancy, infant mortality, maternal mortality and adult illiteracy than shown by per-capita income (see Table 16).

Table 16. Correlation among basic indicators of human development

	HDIranking	IncomePPP	Under5mort	AdultIllit	MatMortality	LifeExpectancy	InfantMort
HDIranking	1						
	126						
IncomePPP	0.8789*	1					
	0						
	113	113					
Under5mort	−0.8789*	−0.8258*	1				
	0	0					
	125	112					
Adultillit	−0.8091*	−0.7082*	0.7393*	1			
	0	0	0				
	106	99	107	108			
MatMortality	−0.8760*	−0.8227*	0.9177*	0.6895*	1		
	0	0	0	0			
	115	105	120	105	120		
Lifeexpectancy	0.8784*	0.7462*	−0.9184*	−0.6216*	−0.8745*	1	
	0	0	0	0	0		
	120	109	125	107	120	126	
Infantmort	−0.8762*	−0.8142*	0.9947*	0.7393*	0.9050*	−0.9135*	1
	0	0	0	0	0	0	
	125	112	136	107	120	125	136

Source: See Appendix 1.
Note: The first line presents the correlation measure, the second line presents the significance level (all observations that are significant at the 95% level are starred) and the third line presents the number of observations available for each calculation.

The correlations with under-five mortality yield exactly the same results as the HDI. Under-five mortality also shows similar correlations with the basic elements of HD as with HDI (see Table 16). The HDI is, of course, a much more widely accepted measure. But the under-five mortality rate has advantages for some purposes, since it is more precise in terms of changes over time and less complicated to calculate.

Given the fact that — for most categories — more than one variable (and in most cases several variables) emerge as a result of following these procedures, the question arises whether one should seek a composite indicator for each category similar to the HDI. We should note that, as a result of the procedures we have followed, the very fact that more than one variable emerges implies that we are left with variables that are *not* highly correlated with one another. Moreover, any composite requires some method of weighting the components, and any such weighting is bound to be arbitrary. Yet there could be advantages in devising a composite measure of achievement for each category from the point of view of comparing country performance in different categories and also investigating changes over time. However, we have not developed such composites at this stage.

High-income countries

Performing the same exercise for OECD countries, we found a good deal of similarity with the developing country story (Table 17). Here we used the same indicators for comparability, although, not surprisingly, data were not available for some indicators (e.g. child labor), and different indicators might be more appropriate for some of the categories for richer countries (e.g. the share of manufacturing exports is probably not relevant to

Table 17. Selected indicators for OECD countries, and relationship to the HDI

Category of human development	OECD countries		
	Indicators retained within each category	Indicators eliminated, because high correlation with the HDI	Indicators not correlated with the HDI and therefore retained
Mental well-being	Male suicide Life satisfaction Prisoners	None	Male suicide Life satisfaction** Prisoners*
Empowerment	GEM HPI2 F/M secondary Unions Married teenage girls	GEM	HPI2* F/M secondary Unions Married teenage girls
Political freedom	Pol/civil liberties Political terror Political freedom	None	Pol/civil liberties Political terror Political freedom
Social relations	Value of friends Value of family Tolerance of neighbors Divorce rate	Value of friends	Value of family Tolerance of neighbors Divorce rate
Community well-being	Civic assoc. Rule of law Alcohol use Trust in others Tolerance of neighbors AIDS deaths Natural disasters,	Civic assoc.	Rule of law Alcohol use Trust in others Tolerance of neighbors AIDS deaths* Natural disasters
Inequalities	Health inequality Horizontal inequality	None	Health inequality Horizontal inequality
Work conditions	Long run u/e Minimum wage	None	Long run u/e** Minimum wage
Leisure conditions	Library books Internet use, telephone availability	Library books	Internet use Telephone availability
Economic stability	GDP cycle Socsec policies	None	GDP cycle Socsec policies
Political stability	Regime durability Political stability Political violence	Regime durability	Political stability Political violence
Environment	Environmental sustainability	None	Environmental sustainability

Notes: *High correlation with under-five mortality; **high correlation with PPP income per head. Shaded areas indicate retained indicator

economic stability in the OECD countries). For the most part, the results were very similar to those for developing countries. One interesting difference was that the various indicators of inequality showed much higher correlation with each other among the rich countries than in the case of developing countries. Another difference was that the HDI was a poorer indicator of our various categories of well-being than in the case of developing countries — with seven out of the 11 categories having no indicator correlated with HDI at above the cut-off rate, whereas for developing countries this applied only in four out of the 11 categories. Two interesting examples are that in developing countries both life satisfaction and poverty proved to be correlated with HDI, whereas neither was in the case of the OECD countries. It is now well established that life-satisfaction (or 'happiness') is not correlated with income per capita in rich countries.[6] It is interesting, and perhaps surprising, that the same lack of relationship is found between life satisfaction and the HDI. Income per capita and under-five mortality each performed even worse than the HDI as correlates of the other indicators in the case of the OECD countries. So, even though highly imperfect, the HDI is a better indicator of the wider dimensions of human development than income per capita in both rich and poor countries; and in rich countries, it is better than under-five mortality also.

Conclusions

This paper has considered how well the HDI represents HD when more broadly defined. Following other contributions in defining the characteristics of a full life, we identified 11 categories that seem to encompass all the major dimensions of human development. For each category, we then identified a potential set of indicators that seem to us plausible measures and for which data are available. We investigated correlations among these measures, and, in order to reduce the number of variables representing each category, we included only one indicator for any set of indicators that are highly correlated with each other, also retaining any indicator that does not show a high correlation with the any other indicator in its category. The aim was to include only variables that are broadly independent.

Our next step was to see how well the selected variables for each category are correlated with the HDI. Any variable in any category that was highly correlated with HDI was then eliminated on the grounds that these variables were already encompassed by the HDI measure. We were left with 31 variables, each representing an independent dimension of HD, showing that the HDI is not adequate as a measure of a broad definition of HD.

We subsequently performed the same exercise with two commonly used alternative aggregate measures of country progress — income per capita (PPP) and under-five mortality — in order to determine whether they 'carried' a larger or smaller set of our HD indicators. We found that under-five mortality performed exactly the same as the HDI, while income

per capita did less well; that is, using income alone misses even more dimensions of a broader conception of HD than using the HDI alone. And, of course, income per capita is also a less good indicator of the basic elements of HD. Carrying out the same exercise for OECD countries gave similar results, although the HDI represented a smaller proportion of indicators. Both PPP income and under-five mortality did worse than the HDI in this respect.

The HDI has been criticized as being redundant because of its high correlation with per-capita income (McGillivray, 1991) In fact this is not a valid objection since the correlation is imperfect, especially among low-income countries, so that HDI does tell us more about a country's performance on some basic elements of HD than per-capita income. Our findings show that HDI is also better than income per capita when one adopts a broader definition of HD, although, of course, they also show that it is still very imperfect in this respect.

This paper explored empirical correlations and did not attempt to investigate causality. We recognize that our procedures are somewhat arbitrary and a change in the categories deployed, indicators adopted, definition of thresholds, and so on, could yield somewhat different results. Our basic purpose, however, is not to be definitive but to show that extending the concept and measurement of HD to a broader set of dimensions seriously affects the way one should measure and assess country performance. We are open to the deployment of alternative categories, indicators, data sources and rules of procedure.

In future work in this area, we intend to identify typologies of developing countries/regions according to their success or failure with respect to the different dimensions of HD and relate this to available policy choices. To the extent that data are available, we would also like to trace the historical progress of the current OECD countries in the various categories, which may help in drawing conclusions about transitions over time. Comparing country performance would be facilitated by reducing the number of retained indicators. This could be achieved, for example, by a change in the correlation coefficient cut-off from 0.6 to 0.5, or by developing some composite indicators for each category. However, unless the original indicators are sufficiently correlated to be effectively summarized in a new single measure without significant loss of information, the problem of multidimensionality will persist; and even when successful, a composite indicator is likely to pose problems of interpretation, as it will ultimately remain a hybrid measure with limited intuitive appeal.

Acknowledgements

The authors are grateful to M. Qizilbash for very helpful comments on a previous draft. They also acknowledge the support of the Carnegie Corporation of New York.

Notes

1 Five of these are contained in Alkire (2002); the sixth (from the ESRC Well-being Research Centre) has been produced more recently.
2 He adds 'the Aristotelian principle,' which, roughly interpreted, is that more complex and sophisticated activities are generally preferred, and hence more desirable, than simpler ones. For example, according to Rawls (1999), algebra would be preferred to arithmetic and chess to checkers (draughts) because they are more complex activities.
3 ''By 'overlapping consensus', I take John Rawls' meaning: that people may sign on to this conception, without accepting any particular metaphysical view of the world, and particular comprehensive ethical or religious view, or even any particular view of the person or human nature'' (Nussbaum, 2000, p. 76). However, Nussbaum argues that the ''primary weight of justification remains with the intuitive conception of truly human functioning and what that entails'' (2000, p. 76).
4 Note that in the factor analyses referred to here (for example, Schokkaert and van Ootegem, 1990; McGillivray, 2005), many of these criticisms — notably relating to difficulties in comparing data between categories and incomplete data-sets — do not apply, given these researchers are seeking to extract variables from one data-set and working with a more limited number of variables.
5 This finding stands in contrast to some critiques (for example, McGillivray 1991) arguing that the HDI may be a redundant measure of HD given it is highly correlated with its component parts.
6 See, for example, Diener and Biswas-Diener (2002), Diener and Seligman (2004), Hamilton (2004) and Layard (2004).

References

Alkire, S. (2002) *Valuing Freedoms: Sen's Capability Approach and Poverty Reduction*, Oxford University Press, Oxford.
Bostock, D. (2000) *Aristotle's Ethics*, Oxford University Press, Oxford.
Camfield, L. (2005) 'Researching quality of life in developing countries', *ESRC Research Group on Well-being in Developing Countries Newsletter*, 3(1).
Diener, E. and Biswas-Diener, R. (2002) 'Will money increase subjective well-being? A literature review and guide to needed research', *Social indicators research*, 57, pp. 119–169.
Diener, E. and Seligman, M.E.P. (2004) 'Beyond money: toward an economy of wellbeing', *Psychological Science in the Public Interest*, 5(1), pp. 1–31.
Doyal, L. and Gough, I. (1991) *A Theory of Human Need*, Macmillan Education, Basingstoke.
Finnis, J. (1980) *Natural Law and Natural Rights*, Clarendon Press, Oxford.
Finnis, J., Boyle, J.M. and Grisez, G. (1987) *Nuclear Deterrence, Morality and Realism*, Clarendon Press, Oxford.
Hamilton, C. (2004) *Growth Fetish*, Pluto Press Ltd, London.
Layard, Richard (2004) *Happiness: Lessons from a New Science*, Penguin Press, New York.
McGillivray, M. (1991) 'The Human Development index: yet another redundant composite development indicator?', *World Development*, 19(10), pp. 1461–1468.
McGillivray, M. (2005) 'Measuring non-economic wellbeing achievement', *Review of Income and Wealth*, 51, pp. 337–364.
Narayan-Parker, D. (2000) *Crying Out for Change: Voices of the Poor*, Oxford University Press for the World Bank, Oxford and New York.
Nussbaum, M.C. (2000) *Women and Human Development: The Capabilities Approach*, Cambridge University Press, Cambridge.
Payne, S. and Lart, R. (1999) 'Researching suicidal behaviour', *Radical Statistics*, 70(Winter).
Rawls, J. (1993) *Political Liberalism*, Columbia University Press, New York.

Rawls, J. (1999) *A Theory of Justice*, revised edition, Clarendon Press, Oxford (first published 1972).

Schokkaert, E. and Van Ootegem, L. (1990) 'Sen's concept of the living standard applied to the Belgian unemployed', *Recherches Economiques de Louvain*, 56(3–4), pp. 429–450.

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

United Nations Development Programme (1990), Human Development Report, New York: UNDP.

Yale Center for Environmental Law and Policy and CIESIN (2005) *Environmental Sustainability Index: Benchmarking National Environmental Stewardship*, Yale University, New Haven, Conn.

Appendix 1. Summary of indicators and sources

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
CORE INDICATORS					
HDI rank	**HDI**	**Composite of life exp., adult literacy & mean schooling, & p/c GDP**	**2002**		**UNDP Human Development Report (HDR) 2004**
p/c GDP	IncomePPP	PPP US$	2002		World Bank Development Indicators (WBDI) 2004
Child mortality rate	Under5Mort	under 5 years old, per 1,000 live births	2002		UNDP HDR 2004
PHYSICAL WELL-BEING					
Adult illiteracy	AdultIllit	Adult illiteracy rate (% age 15 and above)	2002	UNESCO	UNDP HDR 2004
Maternal mortality	MatMortality	Maternal mortality rate (per 100,000 live births)	2000	WHO, UNICEF, UNFPA	Millennium Dev Goals website
Life expectancy	LifeExp		2000–05 estimate		WHO (www.who.org)
Infant mortality	InfantMort	per 1,000 live births	2002		UNDP HDR 2004
INDIVIDUAL MENTAL WELL-BEING					
Suicide rates	MaleSuicide, FemSuicide	per 100,000 people	2003 (or most recent available)		WHO
Life satisfaction	LifeSatis	0–10 ladder, 10 most satisfied	1990s		World Database of Happiness, www2.eur.nl/fsw/research/happiness
Population incarcerated (%)	Prisoners	per 100,000 of population	2004		King's College World Prison Brief, www.prisonstudies.org
EMPOWERMENT					
Population living below $1/day (%)	Poverty1day		1990–2002 (more recent av)		WBDI 2004

Appendix 1. *(Continued.)*

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
Population living below the national poverty line (%)	PovNational		1990–2001 (most recent av)		WBDI 2004
Human Poverty Index (HPI)	HPI	Composite of deprivation in life expect., illiteracy, and lack of access to safe water & health services & malnutrition	2002		UNDP HDR 2004
Gender empowerment measure (GEM)	GEM	Composite of gender inequality in parliament, occupational status & income	2002		UNDP HDR 2004
Ratio of female to male secondary school enrolment	SecFemMale		2000–2001	UNESCO	UNDP HDR 2004
Unmet need for family planning	ContraceptiveLack	% of sexually active men/women not using modern contraception who don't want children for at least 2 yrs	1990–2002 (most recent year available)	UNFPA	Population Reference Bureau
Currently married females age 15–19 (%)	MarriedGirls		1985–2002 (most recent year available)		UN Population Division World Fertility Report
Women in parliamentary seats (%)	FemParliamnt		2004	Inter-parliamentary union (IPU)	Millennium Dev Goals website
Union Density	UnionDensity	% of labor force affiliated with labor unions	1997	ILO Laborstat & World Bank 2001	Yale International Institute for Corporate Governance, http://iicg.som.yale.edu/data/datasets.shtml

Appendix 1. *(Continued.)*

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
POLITICAL AND CULTURAL FREEDOM					
Combined pol rights/civ liberties indicator	PolRtCivLib	Scale of 1–7 with 1 most free; average of 'political rights' & 'civil liberties' scales.	2003		Freedom House
Freedom of worship	FreeWorship	Scale of 1–7 with 1 most free	2000	Religious Freedom in the World	Freedom House Center for Religious Freedom
Amnesty international political terror index	PolTerror	1 to 5 with 5 most repressive	avg. 2000–2003	Amnesty International	http://www.unca.edu/politicalscience/faculty-staff/gibney_docs/pts.xls
Voice and Accountability index	PolFreedom	Measures political rights & ability of citizens to participate, higher #s better	2002		World Bank Governance Indicators
Freedom of the press	FreePress	Business leaders perceptions, 104 countries (rank order)	2004		World Economic Forum Global Competitiveness Report (2004/2005)
Juridical Independence	JuridIndp	Business leaders perceptions, 104 countries (rank order)	2004		World Economic Forum Global Competitiveness Report (2004/2005)
SOCIAL RELATIONSHIPS					
FriendsVeryImpt	FriendsValue	lower numbers indicate more imptance	1999/2001		World Values Survey
FamilyVeryImpt	FamilyValue	lower numbers indicate more imptance	1999/2001		World Values Survey
Neighbor Tolerance	NgbTol	Average response to whether would want to live next to various types of people; lower numbers indicate more tolerance.	1999/2001		World Values Survey

Appendix 1. *(Continued.)*

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
Crude Divorce Rate	CrudeDivorce	Ratio of number of divorces to population.	2001 or most recent		UN Demographic Yearbook
COMMUNITY WELL-BEING					
People victimized by crime	CrimeRate	% of population	1990–2001 (most recent year available)	UNODC	UNDP HDR 2004
Alcohol consumption, recorded	AlcoholUse	p/c litres pure alcohol, ages 15+	2003 data	FAO World Drink Trends 2003	WHO Global Status Report on Alcohol, 2004
Corruption index	Corruption	0 to 10 with 10 least corrupt	2004		Transparency International
Orphaned children	OrphanCount	% of children w/o 1 or both parents	2003		UNICEF
Estimated AIDS deaths	AIDS	% of population	2003	UNAIDS	Millenium Dev Goals website
Participation in civic associations	CivicWork	% of economically active population (includes paid & volunteer work)	2003		John's Hopkins Comparative Nonprofit Sector Project
Trust in others	Trust	Extent to which people feel ''most people can be trusted'', lower numbers show more trust	1999/2001		World Values Survey
Rule of law	RuleofLaw	Extent to which agents have confidence in & abide by rules of society; higher better	2002		World Bank Governance Indicators
Public institutions index	PublicInst	Business leader perceptions of quality of public institutions	2004		World Economic Forum Global Competitiveness Report (2004/2005)
Share of population affected by natural disasters	NatDisaster	Average for period of number affected each year divided by total population.	Average of 1980–2000		Calculated from The OFDA/CRED International Disaster Database - www.cred.be/emdat & WBDI (2004).

Appendix 1. *(Continued.)*

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
Neighbor Tolerance	NgbTol	Average response to whether would want to live next to various types of people; lower numbers indicate more tolerance.	1999/2001		World Values Survey
INEQUALITIES					
Gini of income	IncomeGini		1990–2000 (most recent available)	World Bank	UNDP HDR 2004
Horizontal inequalities	HI	Range from −2 to +4, higher no. represents more disadv.	2000		Minorities at Risk
Rural urban inequalities	RuralUrbIneq	ratio rural/urb pov * share rural/urb pop (Calculated from WBDI data)	1990–2002 (most recent available)		Calculated from WBDI 2004 data.
Gender-related Development Index	GDI	Human Development Index adjusted to account for gender inequality.	2001		UNDP HDR 2004
Life satisfaction inequality	HappyIneq	Dispersion of responses on 0–10 ladder of life satisfaction (std dev.)	1990s		World Database of Happiness
Inequality in health care	HealthIneq	Perceived inequality in access to health care, rich & poor, business leaders survey; lower no. less ineq.	2004		World Economic Forum Global Competitiveness Report 2004/05
WORK CONDITIONS					
Unemployment rate	Unemployment		1992–2003 (Most recent available)		ILO LaborStat

Appendix 1. *(Continued.)*

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
Extent to which empl. conditions are regulated	EmpConditions	Index 1–100 with higher no. reflecting more regulation	1999		Djankov et al. 2000, *The Regulation of Entry*, World Bank working paper (see www.nationmaster.com)
Share employed in informal sector	InformalEmp	% of labor force employed in unofficial economy in capital city of each country as % of official labor force. Data from surveys & econometric estimates.	2000		Yale International Institute for Corporate Governance, http://iicg.som.yale.edu/data/datasets.shtml
Child labor	ChildLabor	% age 5 to 14 involved in labor.	1999–2001 (most recent available)		UNICEF
Existence of minimum wage policy	MinWage	Dummy equals ''1'' if min wage policy in country.	2000		Yale International Institute for Corporate Governance, http://iicg.som.yale.edu/data/datasets.shtml
LEISURE CONDITIONS					
Telephone/Cell phone subscribers	PhoneUse	per 100 population	2002	ITU	Millennium Development Goals website
Internet users	InternetUse	per 100 population	2002	ITU	Millennium Development Goals website
Radios	RadioUsage	per 1,000 people	1997	UNESCO	WBDI 2004
Cinema attendance	CinemaAtt	per 1,000 people	1995–1999 (most recent available)		UNESCO
Newspaper circulation	Newspapers	per 1,000 people	1997–2000 (average)		UNESCO
TV ownership					
ECONOMIC STABILITY					
GDP Cycle	GDPcycle	average annual deviation from mean	1981–2002		Calculated from WBDI 2004 data.
CPI Cycle	CPIcycle	average annual deviation from mean	1981–2002		Calculated from WBDI 2004 data.
Share of manufactured exports in total	ManufExpts	average of 1980, 1990 and 2000 (or closest year)	1980–2000		Calculated from WBDI 2004 data.

Appendix 1. *(Continued.)*

INDICATOR	CODE	NOTES	DATE	ORIGINAL SOURCE	SOURCE TAKEN FROM (if different)
Portfolio Cycle	Portfolio	average for period of share of portfolio inv. (current $ excluding LCFAR) as share of GDP	1980–2000		Calculated from WBDI 2004 data.
Terms of Trade Cycle	TermsTrade	Avg. annual deviation from mean	1980–2000		Calculated from WBDI 2004 data.
Social security policy	SocSecPolicy	Measures social security benefits as avg. of old age, disability, death benefits; sickness/health benefits; unempl. benefits.	2000		Yale International Institute for Corporate Governance, http://iicg.som.yale.edu/data/datasets.shtml
POLITICAL STABILITY					
Political stability measure	PolStability	Composite reflecting perceptions of likelihood of destab/overthrow of govt.	2002		World Bank Governance Indicators
Net refugee outflow	Refugees		1998–2002		UNHCR Statistical Yearbook 2002
Collective political violence in 1990s	CollViolence	Reflects levels of violence within country & whether excessive civilian targetting, 0–8 with 8 worst.	1990s		Marshall, M.G. (2002). *Global terrorism: An overview and analysis*.
Countries with major episode of political violence since 1990	PolViolence	Dummy equals ''1'' if any type of armed conflict	1990 on		Derived from data given in Marshall, M.G. (2005), *Major episodes of pol violence, 1946–2004*
ENVIRONMENTAL WELL-BEING					
Environmental sustainability index	EnvSustain	Multicomponent measure of progress toward env sustainability; higher measure indicates greater progress.	2002		World Econ Forum, Yale Center for Environmental Law & Policy & CIESIN (see www.ciesin.org)