Human Well-being Measurement

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- Human well-being is often treated as a multidimensional concept, consisting of a number of distinct, separable dimensions.

- Empirical research has proposed a number of composite indexes intended to measure multi-dimensional wellbeing, especially at the level of countries.

- An approach that has been particularly popular in the development literature is to report multiple indicators of social development including GDP or GNP per capita, life expectancy, educational attainment, literacy rates, and so on.

- These approaches are intuitively appealing as a solution to the limitations of purely income-based measures, though the composite indicator approach inevitably raises serious questions concerning the rather arbitrary choices of scaling and weighting methods.

Number of composite indexes

- Human Development Index (HDI): The best known
- Physical Quality of Life Index (PQLI)
- Combined Quality of Life Indices (CQLI)
- Human Suffering Index (HSI)

- United Nations Research Institute for Social Development (UNRISD)
- Level of Living Index (LLI)
- General Index of Development (GID)
- Socioeconomic Development Index (SDI)

- **Human Suffering Index (HSI):**
1. Gnp per capita
2. Inflation rate
3. Labour force growth
4. Urban population growth
5. Infant mortality
6. Daily per capita calorie supply
7. Access to clean drinking water
8. Energy consumption per capita
9. Adult literacy
10. Index of personal freedom

Structure and components of composite indexes

$$W_i = \sum_{j=1}^{k} w_j C_{i,j} \qquad i = 1, \ldots, n$$

- where wj is a weight and Cij is the jth component for country i.

- The HDI currently contains **years of life expectancy**, the **adult literacy rate**, the **combined gross school enrolment ratio** and the **logarithm of purchasing power parity (PPP) GDP per capita** (UNDP 2004).

Very High Human Development

1. Norway
2. Australia
3. Iceland
4. Canada
5. Ireland
6. Netherlands
7. Sweden
8. France
9. Switzerland
10. Japan
11. Luxembourg
12. Finland
13. United States
14. Austria
15. Spain
16. Denmark
17. Belgium
18. Italy
19. Liechtenstein
20. New Zealand
21. United Kingdom
22. Germany
23. Singapore
24. Hong Kong, China (SAR)
25. Greece
26. Korea (Republic of)
27. Israel
28. Andorra
29. Slovenia
30. Brunei Darussalam
31. Kuwait
32. Cyprus
33. Qatar
34. Portugal
35. United Arab Emirates
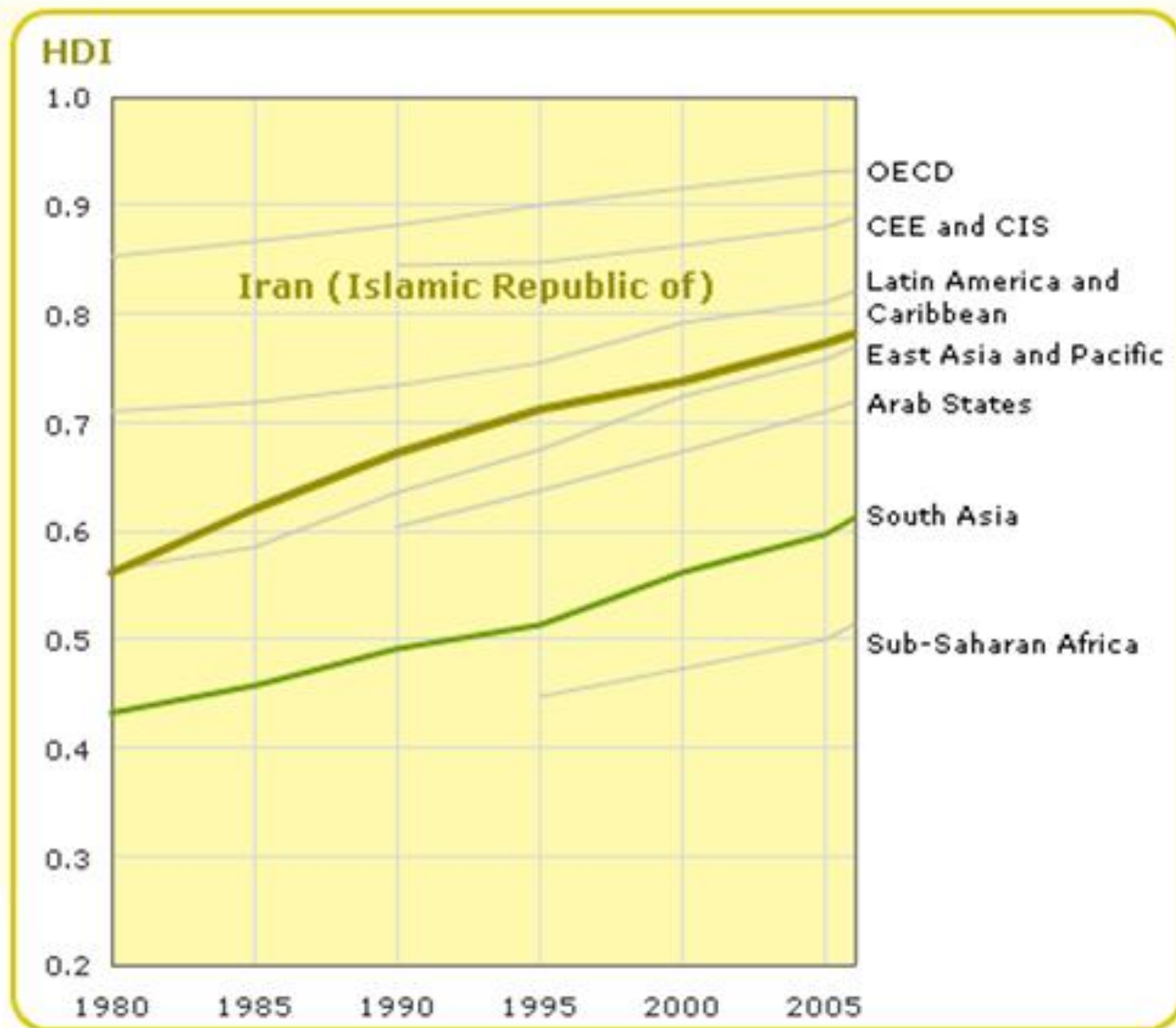36. Czech Republic
37. Barbados
38. Malta

High Human Development

39. Bahrain
40. Estonia
41. Poland
42. Slovakia
43. Hungary
44. Chile
45. Croatia
46. Lithuania
47. Antigua and Barbuda
48. Latvia
49. Argentina
50. Uruguay
51. Cuba
52. Bahamas
53. Mexico
54. Costa Rica
55. Libyan Arab Jamahiriya
56. Oman
57. Seychelles
58. Venezuela (Bolivarian Republic of)
59. Saudi Arabia
60. Panama
61. Bulgaria
62. Saint Kitts and Nevis
63. Romania
64. Trinidad and Tobago
65. Montenegro
66. Malaysia
67. Serbia
68. Belarus
69. Saint Lucia
70. Albania
71. Russian Federation
72. The former Yugoslav Republic of Macedonia
73. Dominica
74. Grenada
75. Brazil
76. Bosnia and Herzegovina
77. Colombia
78. Peru
79. Turkey
80. Ecuador
81. Mauritius
82. Kazakhstan
83. Lebanon

Medium Human Development

84. Armenia
85. Ukraine
86. Azerbaijan
87. Thailand
88. Iran (Islamic Republic of)
89. Georgia
90. Dominican Republic
91. Saint Vincent and the Grenadines
92. China
93. Belize
94. Samoa
95. Maldives
96. Jordan
97. Suriname
98. Tunisia
99. Tonga
100. Jamaica
101. Paraguay
102. Sri Lanka
103. Gabon
104. Algeria
105. Philippines
106. El Salvador
107. Syrian Arab Republic
108. Fiji
109. Turkmenistan
110. Occupied Palestinian Territories
111. Indonesia
112. Honduras
113. Bolivia
114. Guyana
115. Mongolia
116. Viet Nam
117. Moldova
118. Equatorial Guinea
119. Uzbekistan
120. Kyrgyzstan
121. Cape Verde
122. Guatemala
123. Egypt
124. Nicaragua
125. Botswana
126. Vanuatu
127. Tajikistan
128. Namibia

Low Human Development

159. Togo
160. Malawi
161. Benin
162. Timor-Leste
163. Côte d'Ivoire
164. Zambia
165. Eritrea
166. Senegal
167. Rwanda
168. Gambia
169. Liberia
170. Guinea
171. Ethiopia
172. Mozambique
173. Guinea-Bissau
174. Burundi
175. Chad
176. Congo (Democratic Republic of the)
177. Burkina Faso
178. Mali
179. Central African Republic
180. Sierra Leone
181. Afghanistan
182. Niger

HDI trends for Iran (Islamic Republic of) compared with regional groupings: OECD, CEE and CIS, Latin America and Caribbean, East Asia and Pacific, Arab States, South Asia, Sub-Saharan Africa.

Source: Indicator table G of the Human Development Report 2009

Table 1: Iran (Islamic Republic of)'s human development index 2007

HDI value	Life expectancy at birth (years)	Adult literacy rate (% ages 15 and above)	Combined gross enrolment ratio (%)	GDP per capita (PPP US$)
1. Norway (0.971)	1. Japan (82.7)	1. Georgia (100.0)	1. Australia (114.2)	1. Liechtenstein (85,382)
86. Azerbaijan (0.787)	93. Samoa (71.4)	92. Syrian Arab Republic (83.1)	89. Algeria (73.6)	69. Bulgaria (11,222)
87. Thailand (0.783)	94. El Salvador (71.3)	93. Botswana (82.9)	90. Dominican Republic (73.5)	70. Uruguay (11,216)
88. Iran (Islamic Republic of) (0.782)	**95. Iran (Islamic Republic of) (71.2)**	**94. Iran (Islamic Republic of) (82.3)**	**91. Iran (Islamic Republic of) (73.2)**	**71. Iran (Islamic Republic of) (10,955)**
89. Georgia (0.778)	96. Cape Verde (71.1)	95. Lesotho (82.2)	92. Grenada (73.1)	72. Kazakhstan (10,863)
90. Dominican Republic (0.777)	97. Maldives (71.1)	96. El Salvador (82.0)	93. Saint Kitts and Nevis (73.1)	73. Costa Rica (10,842)
182. Niger (0.340)	176. Afghanistan (43.6)	151. Mali (26.2)	177. Djibouti (25.5)	181. Congo (Democratic Republic of the) (298)

Table 1: Saudi Arabia's human development index 2007

HDI value	Life expectancy at birth (years)	Adult literacy rate (% ages 15 and above)	Combined gross enrolment ratio (%)	GDP per capita (PPP US$)
1. Norway (0.971)	1. Japan (82.7)	1. Georgia (100.0)	1. Australia (114.2)	1. Liechtenstein (85,382)
57. Seychelles (0.845)	73. Colombia (72.7)	86. Gabon (86.2)	61. Colombia (79.0)	38. Trinidad and Tobago (23,507)
58. Venezuela (Bolivarian Republic of) (0.844)	74. Nicaragua (72.7)	87. Jamaica (86.0)	62. Jordan (78.7)	39. Malta (23,080)
59. Saudi Arabia (0.843)	**75. Saudi Arabia (72.7)**	**88. Saudi Arabia (85.0)**	**63. Saudi Arabia (78.5)**	**40. Saudi Arabia (22,935)**
60. Panama (0.840)	76. Romania (72.5)	89. Oman (84.4)	64. Dominica (78.5)	41. Oman (22,816)
61. Bulgaria (0.840)	77. Jordan (72.4)	90. Cape Verde (83.8)	65. Occupied Palestinian Territories (78.3)	42. Portugal (22,765)
182. Niger (0.340)	176. Afghanistan (43.6)	151. Mali (26.2)	177. Djibouti (25.5)	181. Congo (Democratic Republic of the) (298)

- The basis for selection of critical dimensions, and the indicators that make up the human development index, is identifying basic capabilities that must have to participate in and contribute to society. These include the ability to lead a long and healthy life, the ability to be knowledgeable and the ability to have access to the resources needed for a decent standard of living. (UNDP 1995: 18)

- The choice of component variables has promoted much discussion.

- Irrespective of how elegantly and emphatically the justifications for components choices might be articulated, in the final analysis the selection is ad hoc.

- What is ultimately required, it would seem, is the known functional form of a well-being production function.

- This is acknowledged in *Human Development Report 1993, which observed that, in an ideal world, the HDI's* design would be guided by a meta production function for human development.

- A related issue concerns the concept of universalism.

- Universalism is the recognition of a shared claim of every person to the elementary or basic capabilities required to lead a worthwhile life.

- it provides a telling criticism for the exclusion of others, as there are indeed many other elementary.
  - human security (physical violence, intimidation)
  - political freedoms or rights

- The subjectivity in the measurement of these variables.

- One important reason why human rights and many other variables are not included in composite indexes is their **limited cross-country availability**.

- Anand and Sen float the idea of different indicators for the capabilities that the index attempts to capture.

- They consider different indicators for the low, medium, and high human development categories reported in the *Human Development Reports.*

INDICATORS OF HUMAN DEVELOPMENT

Human development level	Low		Medium		High	
Human Development Indicator	1.1	Life expectancy	1.1 1.2	Life expectancy Under 5 mortality	1.1 1.2 1.3	Life expectancy Under 5 mortality Maternal mortality
	2.1	Adult literacy	2.1 2.2	Adult literacy Secondary school enrollment	2.1 2.2 2.3	Adult literacy Secondary school enrollment Tertiary enrollment
	3.1	Log of GDP per head up to int poverty line	3.1 3.2	Log of GDP per head up to int poverty line Incidence of poverty	3.1 3.2 3.3	Log of GDP per head up to int poverty line Incidence of poverty Gini coefficient corrected mean National Income

- Ideology and politics can, not surprisingly, play an important role in the selection of variables and indexes have been criticized accordingly.

- The choice of the components of the HDI was intended to elevate, in country rankings, those countries that perform better in terms of non-economic well-being indicators, thus providing greater justifications for activities, projects and programmes sponsored by the UNDP.

Scale equivalence

- Most component indexes combine variables that are measured in different scales.

- Two of its variables, as mentioned, are adult literacy and PPP GDP per capita. Adult literacy is a percentage and as such has a maximum value of 100. PPP GDP has no such upper limit, and current values range from 580 to 61,190 dollars.

- This equivalence is usually achieved by ensuring that the C_{ij} range from 0 to 1 or 0 to 100.
- A value of 0 was often assigned if c_{ij} (the actual value of C_{ij}, prior to rescaling) is the lowest observed among n countries $c_{ij} = c^{min}_{ij}$. Either 1 or 100 is assigned if c_{ij} is the highest observed among these countries $c_{ij} = c^{max}_{ij}$. The formula used for this purpose (with the maximum being set at one) is:

$$C_{i,j} = \frac{c_{i,j} - c_{i,j}^{\min}}{c_{i,j}^{\max} - c_{i,j}^{\min}}$$

- A country could, over time, achieve improvements in each index component but experience a decline in the aggregate value of its index.

The underlying concern was that HDI values were not comparable over time.

- UNDP responded to this criticism, in the *Human Development Report 1994,* by fixing the maximum and minimum values above and below the actual maxima and minima, respectively. These fixed values are described as 'goal posts'.

- The upper goal posts have been set at 'limits of what can be expected within the next 30 years' and the lower goal posts correspond to values 'observed historically, going back about 30 years'

Component	Upper goal	Lower goal
LIFE EXPECTANCY	85	25
ADULT LITERACY	100	0
EDUCATIONAL ATTAINMENT	100	0
PPP GDP PER CAPITA	$40,000	$100

- Yet, it will matter for the ranking of countries according to the composite index if that index is constructed by either summing or averaging the rescaled variables, as is the case with the HDI.
- This is due to the change in component means and variances that result from the rescaling.

Correlations and weights

- Most composite indexes are a response to the perceived inadequacies of income per capita as a measure of well-being; they are an attempt empirically to capture more fully the assumed vitality or complexity of the human well-being concept.

- The UNDP went on to claim that the HDI 'ranks countries very differently from GNP per capita' and that 'the reason is that GNP per capita is only one of life's many dimensions' (UNDP 1990: 14).

- A number of studies have looked at correlations between composite indexes.

- McGillivray (1991) conducted a correlation between the HDI and GNP per capita for a sample of 119 countries (0.859 and 0.889).

- He concluded that the HDI for many country groups was empirically redundant, in that it largely provides us with little more information regarding inter-country well-being levels than the traditional indicator, GNP per capita, alone can provide.

- A related and arguably more important issue, is the correlations between the individual components and also between individual components and the indices as a whole.

- Many Studies showed that, these correlations are very high (0.9).

- The consequence of this is that basing the HDI on any one of its component variables yields very similar insights into inter-country well-being to the indexes as a whole.

correlation coefficients between HDI 2002 and its components

Sample	HDI	Life expectancy	Educational attainment	PPP GDP per capita
All Countries				
HDI	1.000			
Life expectancy	0.925**	1.000		
Educational attainment	0.916**	0.763**	1.000	
PPP GDP per capita	0.924**	0.794**	0.765**	1.000
High HDI countries				
HDI	1.000			
Life expectancy	0.819**	1.000		
Educational attainment	0.743**	0.395**	1.000	
PPP GDP per capita	0.869**	0.688**	0.388**	1.000
Medium HDI countries				
HDI	1.000			
Life expectancy	0.771**	1.000		
Educational attainment	0.692**	0.258*	1.000	
PPP GDP per capita	0.663**	0.264*	0.264*	1.000
Low HDI countries				
HDI	1.000			
Life expectancy	0.747**	1.000		
Educational attainment	0.611**	0.057	1.000	
PPP GDP per capita	0.567**	0.386*	−0.044	1.000

- Noorbakhsh (1998b) demonstrates, however, that while the correlation coefficients are high for the data for all countries, they can be much lower –sometimes statistically insignificant – for the sub-samples of countries.

- The coefficient between the educational attainment and income components is negative. It follows that, for these sub-samples of countries, basing the index on any one component will yield very different information on well-being achievement among countries than the HDI as a whole.

Correlation between life expectancy and real GDP per capita at PPP

- Life expectancy is probably one of the most important and widely used indicators of development.

- Life expectancy are correlated with commonly used alternative indicators. If the correlation is high, then income based measures may serve as a reasonably good proxy for a variety of measures of development.
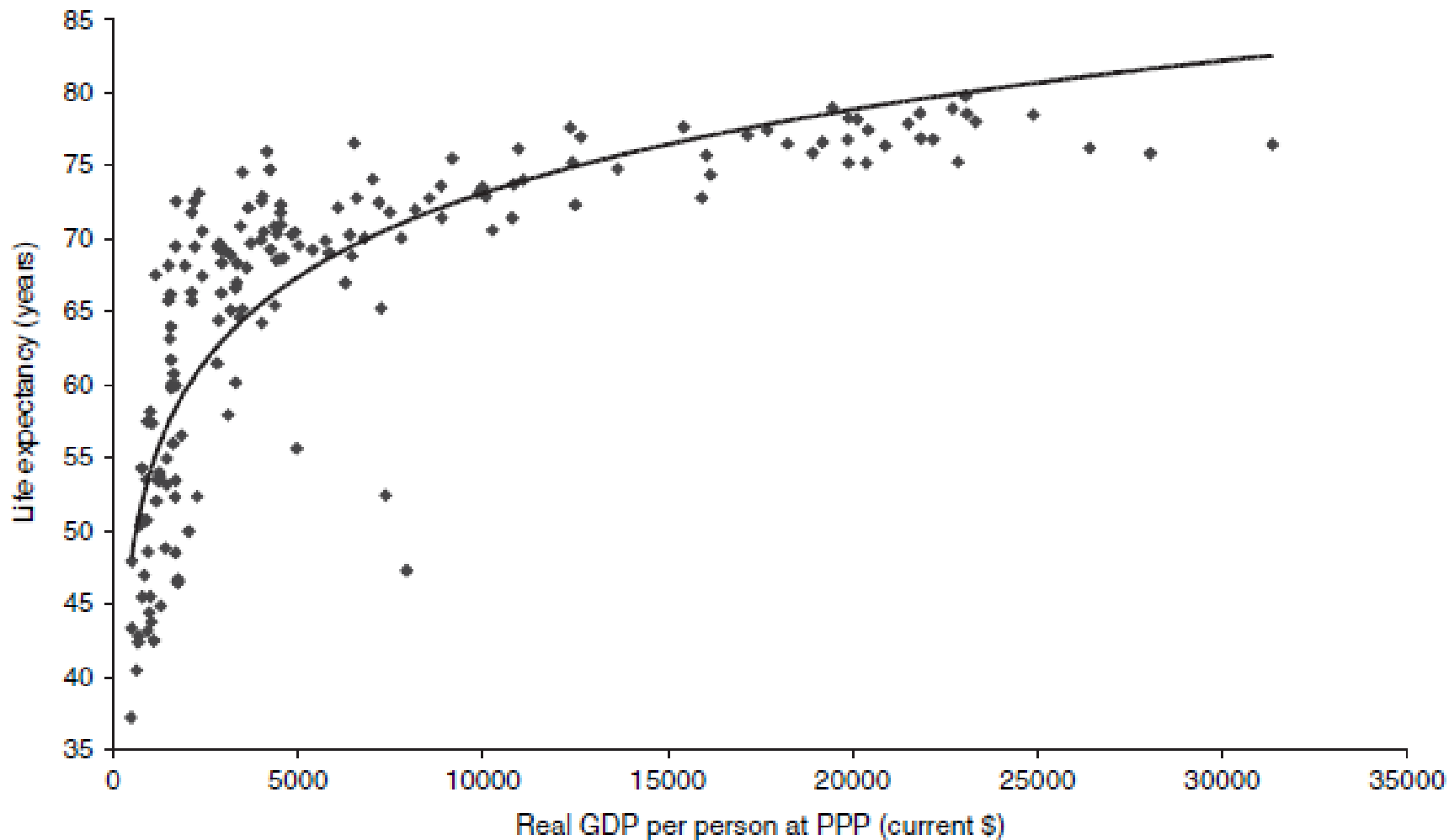
LX = 8.2 ln(GDP) − 2.9 $R^2 = 0.68$; s.e. = 6.0

Real GDP per person and life expectancy across 171 countries, 1994–98

- The relationship between income and life expectancy is strongly positive but clearly non-linear.

$$LX_i = \beta \ln(GDP_i) + constant + \varepsilon_i$$

- A 12 per cent increase in real income would increase life expectancy by one year.

- Inspection of Figure shows that the regression systematically overpredicts life expectancy for the very poorest and the very richest countries whilst it under-predicts for countries with average incomes between US$2,000 and US$10,000.

$$LX_i = \beta_1 \ln(GDP_i) + \beta_2 [DUM_i \ln(GDP_i)] + \beta_3 DUM_i + constant + \varepsilon_i$$

where *DUM is a dummy variable with a value of unity for countries with* income levels below US$6,000 per year and a value of 0 for richer countries.

The causal interpretation of these estimates is that life expectancy will increase by one year when GDP increases by 15 per cent in a rich country or by just eight years in a poor country.

- If the purpose of the composite index under question is primarily statistical, to rank countries in terms of wellbeing achievement, then the high correlations reported in many studies, combined with some of the technical problems outlined above and in the relevant literature, do make differences in this achievement hard to interpret.

Component weighting

- Component weighting is an especially difficult issue, and related in part to the high correlations between component variables.

Ideally, weights should be guided by theory

- Anand and Sen (1992) note with respect to the HDI that a meta production function for human development would be specified, and the contribution of each variable to human development would be its weight.

- Most indexes simply take the sum or the average of the components, hence giving the appearance of equal weights.

- The three components of the HDI, for example, are assigned weights of one third each.

- This, in principle, is almost certainly incorrect, as it implies that each component is equally important, in terms of well-being achievement, at all points of time and levels of achievement, and in all regions, countries, cultures, levels of development, and so on.

- **The UNDP responses:**

since it is probably impossible to achieve agreement on what the weights should be, the simplest response is the best, that being to assign an equal weight to each component.

Policy relevance

- One of the greatest impacts of composite indexes intended to assess national well-being achievement relates to the signals they send to policy makers.

- Universal indexes such as the HDI are currently more concerned with a measurement for ranking countries, and less concerned with the operational capability of the index in terms of policy making at a more practical level for different countries.

- A simple response would be simply to drop a universal index and adopt a set of country specific ones. But this would be at the cost of no longer being able to make inter-country well-being achievement comparisons.

- An index design that avoids this cost is to retain a universal set of components, but with variables on which these components are based varying across countries.

- Anand and Sen (1992) proposed the use of different indicators for the low, medium and high human development categories.

- A more radical approach would be to allow policy makers in each country, or possibly even citizens, to select the variables for each component that are most appropriate to their own country. One could also do the same with component weights.

- Participatory techniques could be used to select variables and assign weights, which would need to be periodically re-assessed as conditions within countries change.

- But because the same components are used across countries, a degree of inter-country comparability is maintained.

- The weights would presumably reflect contemporary priorities, with higher weights being attached to components that are more prominent and important.

- For example, in sub-Saharan Africa the longevity component would probably at present receive a very high weight given the enormity of the HIV/AIDS problem being faced on those countries.

- Another approach might be to retain the universal structure of the index for inter-country comparisons at a particular point in time, but use country specific versions of the index for comparisons of performance over time.