Human Development Index: Introduction

Sabina Alkire (OPHI), 29 Feb 2011
Sen: Decade of Human Development

• Public acclaim is not always a sound way of judging the success of an intellectual enterprise.
Sen: Decade of Human Development

• John Stuart Mill’s book *Subjection of Women*: his only book on which his publisher lost money;

• Bertrand Russell’s book on mathematical logic initially had very few readers;

• Wittgenstein’s *Philosophical Investigations* achieved its prominence only very slowly;

• Mozart’s appreciation in the world of music came ... more hesitantly than he had hoped.
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• why has the Human Development Report received so much reflective attention with such speed in a world where new ideas often take decades, sometimes centuries, to receive the recognition they deserve?
This is, at one level, an easy question to answer. Rather than concentrating only on some solitary and traditional measure of economic progress (such as the gross national product per head), ‘human development’ accounting involves a systematic examination of a wealth of information about how human beings in each society live…. It brings an inescapably pluralist conception of progress.
Basic Human Development Measures

• **Well-Being measures** summarize the data of *all* people.
  
  *Average* --- *HDI, GII*

• **Inequality measures** summarize the range of the *entire* distribution – ratio of two standards.
  
  *Spread* --- *IHDI*

• **Poverty measures** are based on the population who fall short of some minimum standard.
  
  *Base* --- *MPI*
What kind are these?

- Gini Coefficient
- Happy Planet index
- $1.25$/day index
- GDP/capita
- Ratio of 90% to 10%
- Percentage of malnourished children

*Note: many people may not be clear on these distinctions*
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History of HDI: 1990

- Data
- Indicators
- Treatment of Income
- Weights
- Bounds/Normalisation
- Functional form
History of HDI: 1990

• Data

• Indicators
  – *Life Expectancy at birth*,
  – *GDP/capita*
  – *Literacy*

• Treatment of Income

• Weights
History of HDI: 1990

• **Bounds/Normalisation**
  – 1987 values for minimum
  – 1987 values for longevity as max
  – 100% literacy as maximum
  – Income maximum $4861 PPP = poverty line!

• **Functional form**
  *Simple average*
History of HDI: 1991


- **Indicators**
  - Adult Literacy + Mean Years of Schooling
    - Weight: 2/3  Weight: 1/3

- **Income: the poverty max was too sharp**
  - Especially for rich countries
  - Replaced log with a ‘by hand’ version:
History of HDI: 1991

The new approach to income…?

\[ W(y) = \begin{cases} y & \text{for } 0 < y \leq y^* \\ y^* + 2(y - y^*)^2 & \text{for } y^* \leq y \leq 2y^* \\ y^* + 2(y^*)^2 + 3(y - 2y^*)^2 & \text{for } 2y^* \leq y \leq 3y^* \\ \text{and so on.} & \end{cases} \]
History of HDI: 1991

The new approach to income...

.... Actually lasted quite awhile!
History of HDI: 1994

Income *Threshold* changed to ‘current average global value of GDP per capita in PPP’. ($5120)

Minimum income now $200; Max $40,000

(LE: 25, 85)

(Literacy: 0, 100)

(Schooling: 0, 15)
History of HDI: 2000?

Income *Threshold* was dropped

Minimum income lowered to $100;
Maximum maintained at $40,000

Income treated with simple log

\[(\log y) - \log (100) / (\log 40K) - \log 100\]
Old Human Development Index

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>• <strong>Life expectancy</strong> at birth ( (I_1) )</td>
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<tr>
<td>Education</td>
<td>( (I_2) ): Weighted average of:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Adult literacy</strong> rate ( (w=2/3) )</td>
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<tr>
<td></td>
<td>• Combined primary, secondary and tertiary <strong>gross enrolment</strong> ratio ( (w=1/3) )</td>
</tr>
<tr>
<td>Standard of living</td>
<td>• Log of <strong>GDP per capita</strong> (PPP US$) - log to incorporate the diminishing returns. ( (I_3) )</td>
</tr>
</tbody>
</table>
Old Human Development Index

For each dimension, maximum and minimum values are determined and a dimension index is calculated as:

\[ I = \frac{\text{Actual Value} - \text{Min}}{\text{Max} - \text{Min}} \]

\[ \text{HDI} = \frac{1}{3} [I_1 + I_2 + I_3] \]
Criticisms of HDI

• Dimensions
  – Why not political freedom?

• Indicators
  – Why only these? Why not nutrition? HH income?
  – Correlation between indicators => redundancy?

• Data (doesn’t change every year)

• Weights

• Aggregation
  – How treat income? Censored? Log?

• Limitations
  Inequality, Gender, Macro, Welfare
Some Criticisms of HDI

• Weak Indicators
• Missing Dimensions
• Normalization introduces artifacts
• ‘Equal’ Weights are not equal, nor justified
• Functional Form
• Comparisons across Time Problematic
• Ignores Inequality
• Redundancy
Weak Indicators

• For all countries, one indicator is highly correlated (> .9) with other two (McGillivray & White 93) – not for subsets of countries by low/med/high HD.
• Issues of comparability; extrapolation for missing values.
• Stock and flow indicators are combined
• Some Indicators (LE) are not highly policy responsive
• LE at birth problematic – better age-specific LE (Anand)
• PPP imperfect
• Log of income arbitrary
• Use of US Dollar currency PPPs affects rankings (e.g. vs gold)
Missing Dimensions

• Too restricted. “One of the most common criticisms leveled at the HDI is that it excludes other social achievements crucial to the quality of life most notably political freedom and human rights.” – Booyesen 2002 See Lind, 1992, Srinivasen 1994, Hopkins 1991, ), Chakravarty.

• *Also excludes environment, work, personal security*

• Streeten 1994 argues against adding political freedom to the HDI because: 1) political freedom can’t be traded off against the other dimensions; 2) PF has more volatility so affect intertemporal stability of index; 3) new dimensions compromise objectivity; 4) relation between political freedom and HD not that clear cut.
### Indicators and Dimensions

<table>
<thead>
<tr>
<th>Authors</th>
<th>Defining concepts</th>
<th>Bodily well-being</th>
<th>Material well-being</th>
<th>Mental development</th>
<th>Work</th>
<th>Security</th>
<th>Social relations</th>
<th>Spiritual well-being</th>
<th>Empowerment and political freedom</th>
<th>Respect for other species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finnis, Grizez, and Boyle (1987)</td>
<td>Basic human values</td>
<td>health and safety</td>
<td></td>
<td>Practical</td>
<td>Skillful performance in work and play</td>
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<td>Friendship</td>
<td>Harmony with ultimate source of reality</td>
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<tr>
<td></td>
<td>Intermediate needs^</td>
<td>and water – Health care – Safe</td>
<td>security</td>
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<td></td>
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<td>birth control and child bearing –</td>
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<td>Safe Physical environment</td>
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<td>Camfield (2005)</td>
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<td>reason</td>
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<td>Lawfulness – (access to justice)</td>
<td>-Community relations</td>
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<td>_play</td>
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<td>Personal physical security –</td>
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<td>Security in old age</td>
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^ Indicates a need for further clarification or expansion.
Normalization

- Weight of indicator is sensitive to the choice of endpoint
- HDI rankings sensitive to the upper bound (Noorbakhsh, 1996)
- Income upper bound too low for developed countries? (Trabold-Nubler, 1991)
## Normalization

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th></th>
<th></th>
<th>2005</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Education Index (%)</td>
<td>Life Expectancy (Years)</td>
<td>GDP (PPP USD)</td>
<td>HDI</td>
<td>Rank</td>
<td>Education Index (%)</td>
</tr>
<tr>
<td>USA</td>
<td>97.0%</td>
<td>77.5</td>
<td>39,676</td>
<td>0.948</td>
<td>8</td>
<td>97.1%</td>
</tr>
<tr>
<td>Finland</td>
<td>99.0%</td>
<td>78.7</td>
<td>29,951</td>
<td>0.947</td>
<td>11</td>
<td>99.3%</td>
</tr>
<tr>
<td><strong>Difference in performance in two years</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>0.1%</td>
<td>0.4</td>
<td>2214</td>
<td>0.003</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>Finland</td>
<td>0.3%</td>
<td>0.2</td>
<td>2202</td>
<td>0.005</td>
<td></td>
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</tr>
</tbody>
</table>

HDI of USA in 2005, had the GDP been not restricted to 40,000 PPP USD.
‘Equal’ Weights

- Weights are not effectively equal but are affected by the lower and upper bounds.
- Still, Chowdhury and Squire, 2006 found that expert-derived weights did not significantly differ from equal weights.
- When robustness tests are applied 2004 human development index ranking, 70% of all possible comparisons between countries would not change under any weights. If the weights vary only between 0.25 and 0.5 for each dimension, then 92% of comparisons are robust (Foster, McGillivray and Seth 2009 See also Cherchye, Ooghe and van Puyenbroecke 07).
Functional Form

- HDI components’ means have different variances
- Multiplicative more sensitive to improvements in underachieving domains
Comparison across time

• Low, Med, Hi and now VHigh HD category definitions vary over time.

• Direct intertemporal comparisons are not possible from HDRs.

• Reports provide up-to-date HDI trends based on consistent data time series & methodology. (e.g. Table G in HDR 2009)
Ignores inequality

• HDI is the same for any distributions having the same mean. This has generated a huge amount of criticism and many proposals for improvement – e.g. Hicks 1997, Sagar and Najam 1998, Foster Lopez-Calva Szekely 2005, Grimm Harttgen Klasen and Misselhorn 2008, Seth 2009.
Redundant?

- Stewart 1985, McGillivray 1991 and McGillivray & White 1993, and Srinivasan 1994 among others draw attention to association between indicators [E.g. the Kendall tau coefficients (τ) for 2004 are 0.55 for health and education, 0.66 for health and income, and 0.58 for income and education].

- However note that positive associations between indicators produce rankings that are more robust to small changes in weights (Foster McGillivray & Seth 2009).
Incomplete Bibliography on HDI Methodology


