The HDI Debate 2010

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The HDI Debate 2010

1. Issues

2. Errors

3. Politics
New HDI:

Changes:

1) Functional Form
2) Indicators \((h, y)\)
3) Boundaries
Old HDI:

$$HDI^0(I_h, I_e, I_y) = \frac{I_h + I_e + I_y}{3}$$

\(h = Health\)
\(e = Education\)
\(y = Income\)
New HDI:

\[ HDI(I_h, I_e, I_y) = I_h^{1/3} \cdot I_e^{1/3} \cdot I_y^{1/3} \]

\[ h = Health \]
\[ e = Education \]
\[ y = Income \]
Where, as before:

\[ I_h = \frac{h - h^o}{h^* - h^o} \]

\[ I_e = \frac{e - e^o}{e^* - e^o} \]

\[ I_y = \frac{\log y - \log y^o}{\log y^* - \log y^o} \]

* = upper bound
° = lower bound
Main problems with Old HDI:

1. A country can rank well even if one dimensional index is relatively low.

Desai (1990): “Going back to the notion of capabilities as being corealisable, one should try to restrict the substitutability as between the basic variables (...) [making the] deprivations multiplicative, each feeding off the other. Such a weighting would heighten the plight of the very poor and make the gradient of human development steep.”
Main problems with Old HDI:

2. Changing upper bounds $h^*$, $e^*$ and $y^*$ amounts to modifying the weights on variables.

Upper boundaries do change across time. What is the *normative* justification for their impact on HDI?
The New HDI:

The new HDI rankings are invariant to $h^*$, $e^*$ and $y^*$.

*The upper bounds can change without affecting HDI rankings.*
The New HDI stresses ‘joint importance’ of dimensions:

An increase in a person’s ability to live a long life enhances the set of possible lifestyles that the individual may adopt, but not by much if that individual has had very limited access to educational opportunities. Similarly, an increase in a person’s educational attainment makes more lifestyle options open to the person the longer that person expects to live.

Zambrano
Does the Change in Functional Form Matter in Practice? – or just in Theory?
Does the Change in Functional Form Matter in Practice?

Not Much
Does the Change in Functional Form Matter? In some cases!

Table 1. The rankings of selected countries according to various criteria

<table>
<thead>
<tr>
<th>Country</th>
<th>Multiplicative HDI</th>
<th>Additive HDI</th>
<th>Life exp. rank</th>
<th>Education rank</th>
<th>Income rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belize</td>
<td>78</td>
<td>72</td>
<td>41</td>
<td>74</td>
<td>94</td>
</tr>
<tr>
<td>Cameroon</td>
<td>131</td>
<td>137</td>
<td>152</td>
<td>119</td>
<td>128</td>
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<tr>
<td>Comoros</td>
<td>140</td>
<td>134</td>
<td>116</td>
<td>138</td>
<td>152</td>
</tr>
<tr>
<td>Liberia</td>
<td>162</td>
<td>155</td>
<td>133</td>
<td>125</td>
<td>167</td>
</tr>
</tbody>
</table>
So what is at stake, really?
The HDI Debate 2010

1. Issues
   - Comparability
   - Tradeoffs
   - Indicators
   - Data
   - IHDI-HDI match
Issues: Comparability

The published HDI was never comparable across Human Development Reports data revisions new price series, life expectancy methodological changes – e.g. 1994

1997: consistent HDI series published annually.

2010: consistent HDI since 1980 (Table 2)
Comparability of HDI over time

• The arithmetic mean (aggregation function of the old HDI) is very sensitive to the particular goalposts chosen. So if these goalposts were to change in future, the HDI rankings would be substantially affected.

• On the contrary, the geometric mean (aggregation function of the new HDI) is less dependent on that. Although absolute values of HDI will change, the rankings will not and the % differences will not either.
Issues: Tradeoffs

Ravallion’s 1997 paper “Good and Bad Growth: the Human Development Reports” criticised HDI’s Tradeoffs in old Formulae.

In 2010, he argues

1. the multiplicative HDI makes an extra year of life expectancy much more valuable in monetary terms for rich versus poor countries
2. the multiplicative formulation has devalued longevity in poor countries
Issues: Tradeoffs

Figure 2. 'Tradeoffs' between Life Expectancy and Income

- Multiplicative HDI
- GNI ($ per person per year; linear scale)
Issues: Indicators

GNI
  but for which year?
  why is it still logged?
Mean years of schooling for 25 years+

School Life Expectancy
  modelled not measured

Overall
  Country coverage
  National usage for within-country analysis
Issues: Data

Discussed last week:

- year of GNI
- School Life Expectancy
- Mean years of Schooling
Issues: IHDI-HDI

In 2010, IHDI and HDI ‘match’: one can explain IHDI as the reduction of HDI due solely to inequality within dimensions.

**Test:** what would be the interpretation if HDI were the *arithmetic* mean?
Implicit Tradeoffs in the HDI

• They are embedded in the HDI by the implicit weights and the aggregation formula.

• Tradeoffs refer to the amount that must be given up of a component in order to achieve an extra unit of another component holding the same level of overall HDI.

• In economics, that’s called the Marginal Rate of Substitution.
Implicit Tradeoffs in the HDI

• The Marginal Rate of Substitution is given by the ratio of partial derivatives.
• Each of these derivatives is the marginal weight of each dimension.
• Conceptually, the MRS for example, it is:
• How much does the HDI changes when there is an increase of a year in life expectancy, as a ratio of how much does the HDI changes when there is an increase of PPP$1 in income.
Implicit Tradeoffs in the HDI

• Ravallion (2010) says those tradeoffs have not been made explicit and—moreover—he thinks they are unreasonable. Why? Let’s see.

• OLD HDI had a linear formula, except for the indicator on income, which was logged. That was the only non-linearity.

• Thus the marginal weight of longevity was a constant. However, the marginal weight on income depended on the income level.
Implicit Tradeoffs in the HDI

- Thus, in the OLD HDI, the marginal weight of longevity was a constant. However, the marginal weight on income depended on the income level.

- As a consequence, the monetary valuation of an extra year of life was increasing in the country’s income level. Ravallion criticised this in 1997.
Implicit Tradeoffs in the HDI

\[ VLE_{old} = Y \frac{\ln(Y_{\text{max}}) - \ln(Y_{\text{min}})}{(L_{\text{Emax}} - L_{\text{Emin}})} \]

• However it was proportional to the income value. Essentially, it was

\[ VLE_{old} = Y \times C \]

(where C is a constant given by the goalposts)
Implicit Tradeoffs in the HDI

• In the NEW HDI, the formula is no longer linear but *multiplicative*. And it also has the *logged income*. So now the weight on longevity is no longer constant, as nor is the weight on income.

• As a consequence, the monetary valuation of an extra year of life is now increasing in the country’s income level in a non-proportionate way, and dependent on the particular life expectancy value of the country.
Implicit Tradeoffs in the HDI

\[ VLE_{\text{new}} = Y \left( \ln Y - \ln Y_{\text{min}} \right) / (\LE - \LE_{\text{min}}) \]

• The monetary valuation of an extra year of life is now increasing in the country’s income level in a non-proportionate way, and dependent on the particular life expectancy value of the country.

• What’s the effect?
Implicit Tradeoffs in the HDI

- The range of valuations of life expectancy from poor to rich countries has been exacerbated.
- Extreme values:
  - Zimbabwe: $0.51 per year of life expectancy.
  - Liberia: $5.51 per year of life expectancy.
  - Qatar: $8876 per year of life expectancy (17,200 times higher than in Zimbabwe and 1,600 times higher than in Liberia!!)
Implicit Tradeoffs in the HDI

• Ravallion revises economic studies on monetary valuations on longevity and the gradient in the marginal cost of longevity implied by the HDI are far greater than those suggested by these studies.

• The valuation of longevity has decreased for 158 countries with the new HDI.
Implicit Tradeoffs in the HDI

• “Across individuals, one expects the value attached to extra longevity to rise with income... One would expect people in rich countries to be willing to pay more for extra longevity. However, such observations do not justify building an income gradient into the valuation of longevity. The HDI is intended to embody social values which need not accord with private ones”. (Ravallion, 2010, p. 12)
Implicit Tradeoffs in the HDI

• Policy Implication of the income gradient into the valuation of longevity:

• “The government of a poor country should not be willing to pay more than a very small sum for an extra year of expected lifespan for its citizens, while the government of a rich country would be encouraged to spend vastly more for the same gain in longevity.... 17,000 times more!” (Ravallion 2010, p. 12)
Implicit Tradeoffs in the HDI

- Valuations of Schooling:
- Again, the valuation now depends non-proportionally on the income level, as well as on the particular MS and ES of the country.
Implicit Tradeoffs in the HDI

• Again, we see a marked income gradient.
• Extreme:
  • Zimbabwe: $1.68 per person per year
  • Congo: $33 per person per year
  • Qatar: $53,000 per person per year
• While the valuations of longevity seem low, the valuations of schooling seem high. **Why would education have such a higher intrinsic value than longevity?**
Implicit Tradeoffs in the HDI

- Why would education have such a higher intrinsic value than longevity?
- Moreover, this is not justified by economic studies on the value of returns to schooling.

- Policy implication: “A shorter but better schooled life is preferred by the HDI”
Implicit Tradeoffs in the HDI - Counter-arguments

• The HDI is not a welfare function to be maximised. It does not encompasses all the development aims. It should be seen merely as index of capabilities.
Implicit Tradeoffs in the HDI-Counter-arguments

• Thus the income valuations of longevity and schooling while technically appealing are conceptually wrong. Because people value other things (apart from the 3 considered in the index), there is no necessary relationship between the trade-offs implicit in the index and the value that people assign to these components.
Implicit Tradeoffs in the HDI-Counter-arguments

• The fact that the ‘valuation of longevity’ is 17,000 times higher in Qatar than in Zimbabwe simply indicates the relative abundance of income with respect to health in this country and government should interpret this as a need to invest these resources into increasing life expectancy.
Implicit Tradeoffs in the HDI-Counter-arguments

• On the other hand, the ‘low valuation of longevity’ in Zimbabwe suggests the urgency of this country to improve its material conditions (without reducing its achievements in health)

• The key question is not how much a country needs to sacrifice of one dimension in order to improve the other but rather *where does the marginal dollar invested have the highest impact?*
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2. Errors
   - Ravallion
   - Economist
Errors: Ravallion

Magnitude of Tradeoffs:
the difference between poor and rich countries’ $MRS_{h,y}$ has not been exacerbated

Why?
1) Binding income cap before: so growth was infinitely more important in poor countries
2) Now, growth is 4.23 orders of magnitude more important (17000).
Errors: Ravallion

Interpretation of Tradeoffs:
It is not correct to interpret the marginal rates of substitution between life expectancy and income ($\text{MRS}_{h,y}$) as capturing the dollar value of an extra year of life expectancy.

Why?
HDI is not intended to be maximized alone. (but … )
Wrong Numbers 6 Jan 2011

Global League tables are interesting, but not always reliable.

‘The UNDP puts countries into 3 categories based on their HDI number: low, medium and high.’
Wrong Numbers 6 Jan 2011

Wolff: ‘the probability that any country is in the wrong category is as high as 45%’
Wrong Numbers *is wrong*:

- mis-cited Wolff (he used old HDI)
- Mis-cited categories
- there are 4 categories not 3

- ‘Still, we welcome the scrutiny’
The HDI Debate 2010

3. Politics

- Debate intentional?
- Simplicity
- Cost of Change
- New audience – economic?
- Changes over time
Slides on Inequality
Since 1990:

What shall we do about inequality?

The HDI is the mean level of achievement across all people and dimensions....

But this ignores inequality!
Could we find the HDI every household would have if there were no inequality?
What would my HDI be?