ENVIRONMENT

Verification and Sanctions

Reliable verification\(^2\) is of crucial importance for the acceptance of Joint Implementation. The more intensive the verification, the higher a project's transaction costs. Every project must be subjected to independent verification. The length of verification intervals depends on the duration of the project. A national evaluation authority should carry out spot checks in order to monitor the reports of the independent verification organisations. The precise framework and implementation of national verification concepts is a matter for individual countries. Agreement on a set of international verification standards would be a good thing.

Sanctions must be imposed on the project participants if the planned emission reductions are not achieved. In the case of private projects, concessions can be correspondingly cut. Breaches of contract between private enterprises could be punished according to the rules of international civil law. A "Red List" containing all known deliberate "Joint Implementation contract breakers" could act as a deterrent. In the case of prolonged or deliberate infringements of contract, the guilty parties should be excluded, either temporarily or permanently, from the Joint Implementation system; this would be registered in the "Red List". The Conference of the Parties should establish a dispute settlement procedure for bilateral or multilateral disputes along the lines of the new GATT dispute settlement mechanism.

DEVELOPMENT INDICATORS

Irmgard Nübler*

The Human Development Index Revisited

The emergence of the Human Development Index has stimulated wide-ranging debate about its usefulness and ability to measure human development adequately.\(^1\) This article discusses whether the HDI should be rejected in view of the criticism it has attracted, or improved, refined and more widely used.

Since 1990 the United Nations Development Programme (UNDP) has published an annual Human Development Report, in the same way as the World Bank publishes a World Development Report. Both reports include a ranking of all countries according to their "level of development". Whereas the World Development Report uses per capita income as the indicator for development, the UNDP has devised a new indicator, the human development index (HDI). Direct comparison of the two country rankings shows substantial differences for a number of countries. The HDI therefore calls into question the use of per capita income as the dominant development indicator.

Human Development and the HDI

The UNDP considers human development as a very broad concept that places human beings at the centre of development as the "real end of all activities".\(^2\) Human development is defined as a process of enlarging people's choices and relates to economic, political, social and cultural fields. The concept is universally applicable to both developing and industrial countries.\(^3\)

Human development is an abstract variable that cannot be observed, and hence cannot be measured directly. Consequently, the UNDP developed a measurement concept to portray the abstract variable. In general, a measurement concept consists of three conceptual levels:

- an abstract variable, which is the ultimate criterion of interest but which is not observable and hence cannot be measured directly;


\(^3\) UNDP, op. cit., p. 11.

* Free University, Berlin, Germany.

INTERECONOMICS, July/August 1995
DEVELOPMENT INDICATORS

Table 1
The Measurement Concept of the HDI

<table>
<thead>
<tr>
<th>Abstract variable:</th>
<th>Human development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions:</td>
<td></td>
</tr>
<tr>
<td>Longevity</td>
<td>Knowledge</td>
</tr>
<tr>
<td>Decent standard of living</td>
<td></td>
</tr>
<tr>
<td>Indicators:</td>
<td></td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>Literacy</td>
</tr>
</tbody>
</table>


In order to measure the abstract variable of "human development", the HDI uses four empirical variables that are allotted different weights in the index: Life expectancy at birth (1/3), literacy rate (2/9), average number of years of schooling (1/9) and real per capita income (1/3). The various measurement variables are rendered comparable by transforming the observed country values for each variable to a scale ranging from 0 to 1. In the 1994 HDI the variables life expectancy, literacy and average years of schooling are converted linearly. Real per capita income, however, is converted linearly up to $5,120 and logarithmically above that level. The four scaled values are then weighted and added together to form the HDI. The HDI values therefore also lie between 0 and 1, and the higher a country scores the higher its human development is considered to be.

The first part of this article examines the extent to which this measurement concept is actually capable of measuring the abstract variable of human development. If the validity of measurements cannot be guaranteed, the HDI in its present form must be rejected. Consequently, discussion of the validity and assessment of the HDI must be accompanied by consideration of whether and to what extent methodological shortcomings can be eliminated by modifying or extending the index.

Basis of the Measurement Concept

One shortcoming of the HDI lies in the inadequate theoretical and empirical basis of its design. The concept of human development is described in terms of economic, political, social and cultural dimensions, but the HDI relates only to social and economic dimensions, namely a long and healthy life, knowledge and a decent standard of living. No convincing reasons are given for choosing these dimensions and ignoring others, such as political and social freedom or respect for human rights. Furthermore, the choice of the individual indicators on the basis of their ability to index the degree of success in terms of the dimensions is open to challenge. However, alternative indicators often cannot be used because of poor data availability; for example, the UNDP would have preferred the "nutrition status of children under age 5" as their ideal health indicator, but data were not available. Over the long term, this shortcoming could be eliminated by improving the data, and the use of a set of indicators to measure one particular dimension could help resolve conceptual problems.

The weighting as well as the choice of the dimensions and indicators is based essentially on implicit assumptions and value judgements. Ideally, the weights should be determined by reference to a welfare function showing the contribution of each dimension to overall social well-being. Such a function is not known, so that whatever weighting is chosen it will be arbitrary to some extent. Nevertheless, the UNDP should at least explain why it opted for nominal equal weighting of the three dimensions.

The choice of the various transformation functions is also open to criticism. No justification is given for the decision to convert the individual indicators of life expectancy, literacy and average number of years of schooling on a linear basis. In fact, it is reasonable to assume that education displays declining marginal utility, and indeed studies for different regions show falling social rates of return from education investment as the level of education rises. This suggests transformation of the variable average number of years of schooling on a progressive scale.

The non-linear, non-continuous transformation of per capita income above $5,120 is justified on the grounds of the declining marginal utility of income.

---

4 $5,120 is the current average global value of real GDP per capita in purchasing power parity dollars.
5 This approach will be discussed in greater detail from the point of view of the validity of the approach.