

TECHNICAL NOTE 2

A human development index by income groups

The human development index (HDI) provides a composite snapshot of the national average of three important indicators of human well-being (see *Technical note 1*). But it does not capture variations around the average linked to inequality. This year's Report presents for the first time an HDI by income quintiles. The new measure, intended both to address a major human development issue and to stimulate discussion, points to large inequalities between rich and poor in many countries.

The HDI by income quintiles disaggregates performance by income quintile for 15 countries. Full details of the methodology used are in a background paper prepared for this year's Report (Grimm and others 2006). This technical note provides a brief summary.

Methodology

Construction of the HDI by income quintiles follows the same procedure as for the standard HDI. Life expectancy, school enrolment, literacy and income per capita data from household surveys are used to calculate the three dimension indices—health, education and income—by income quintile.

Data for the index are drawn from a variety of sources. For developing countries household income surveys are used to calculate the education and gross domestic product (GDP) indices for each quintile, and Demographic and Health Surveys are used to calculate the life expectancy index. Because the two data sets do not cover the same households, the information from the surveys is linked by approximating income for households in the Demographic and Health

Surveys using variables that are available in both sets of surveys. The correlation between household income per capita and a set of household characteristics available in both surveys is estimated and used to generate a proxy for the income of households in the Demographic and Health Surveys. These characteristics include household structure, education and age of the household head, area of residence, housing characteristics and the like.

For the two developed countries in the study, Finland and the United States, GDP and education data are from the Luxembourg Income Study, and income and life expectancy data are from published empirical work.

Data for the construction of the index are derived as follows.

Life expectancy

Calculations are based on infant mortality data from Demographic and Health Surveys. Infant mortality has proven a reliable proxy for overall mortality patterns and thus for life expectancy. Infant mortality rates for each income quintile are applied to Ledermann model life tables (a tool for estimating life expectancy based on the historical relationship between life expectancy and infant mortality).

The education index

The education index is based on adult literacy and school enrolment data. Adult literacy data are available directly from the household income surveys for each income quintile. To calculate the quintile-specific gross enrolment index, the combined gross enrolment ratio for each quintile is calculated. Each individual ages

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5–23 attending school or university, whether general or vocational, is considered enrolled. The quintile-specific gross enrolment index is then calculated using the same minimum and maximum values that are used in calculating the standard HDI.

GDP index

The GDP index is calculated using the income variable from the household income survey. For conceptual reasons and because of measurement errors, mean income per capita calculated from the household income surveys can be very different from GDP per capita from national accounts data, which are used to calculate the GDP index in the standard HDI. To eliminate differences in national price levels, household income per capita calculated from the household income surveys is expressed in US dollars in purchasing power parity (PPP) terms using conversion factors based on price data from the latest International Comparison Program surveys provided by the World Bank. This income per capita is then rescaled using the ratio between the household income variable and GDP per capita expressed in PPP (taken from the standard HDI).

Finally, these data are rescaled to the same average as that of the standard HDI for the relevant year. The HDI by income quintiles is then calculated according to the standard formula (see *Technical note 1*):

$$\frac{\text{Life expectancy index} + \text{education index} + \text{GDP index}}{3} = \text{Human development index}$$

This calculation is carried out for each quintile.

Issues for discussion

The HDI by income quintiles exercise provides a simple, intuitive and transparent approach for measuring important human development disparities within countries. It provides a useful composite indicator for tracking inequalities in income and wider inequalities in opportu-

nity linked to health and education. However, the use of the HDI model to examine national inequalities raises a number of conceptual and methodological problems.

Consider first the relationship between income and the other indicators. The HDI by income quintiles measures annual incomes, which fluctuate considerably due to shocks and to lifecycle developments. Taking an annual average snapshot of the income of a household in, say, the poorest quintile can obscure very large dynamic changes over time. This produces additional methodological problems, not least because linking more stable health and education outcomes to fluctuating incomes can bias the results.

Data quality in the household surveys presents another set of problems. These problems are addressed here by the simplifying assumptions outlined above and explained in more detail in Grimm and others (2006). But aligning demographic and health survey and household income survey data is inherently problematic, and other approaches are possible. For developed countries, data quality is a less immediate problem. But cross-country comparisons remain difficult. In the case of Finland and the United States the assessment of life expectancy by income groups is based on data for the early 1990s linked to current incomes. However, data constraints mean that the income measure differs from that used for the other two components. In addition, Luxembourg Income Study data do not contain enrolment data, which must then be proxied by attainment data.

One final concern relates to the scale of inequality. In proportionate terms, differences between the rich and poor are much larger in the income dimension than in the health and education dimension. Arguably, smaller differences in health and education might, however, be just as important from a human development point of view and should therefore attract a greater weight in the HDI by income quintiles than they currently have. These are broader methodological issues inherent in such composite indices that will be investigated in future Reports.