

Technical notes

1. The human development index

Construction of the human development index (HDI)

The HDI has opened new perspectives on measuring and analysing development. But there can be no doubt that the work in this area is still at its beginning. Much more research is needed—as is more experience with using the HDI for various practical purposes of assessing, planning or programming development. UNDP would welcome any contributions to this topic, to be taken up in next year's *Human Development Report*, from interested development research scholars and practitioners.

The HDI includes three key components: longevity, knowledge and income, which are combined in a three-step process to arrive at an average deprivation index (for a full technical description, see *Human Development Report 1991*, technical note 1, pp. 88-89). Longevity is measured by life expectancy at birth as the sole unadjusted indicator. Knowledge is measured by two educational stock variables: adult literacy and mean years of schooling. The measure of educational achievement is adjusted by assigning a weight of two-thirds to literacy and one-third to mean years of schooling:

$$E = a_1 \text{ LITERACY} + a_2 \text{ YEARS OF SCHOOLING}$$

$$a_1 = \frac{2}{3} \text{ and } a_2 = \frac{1}{3}$$

For income, the HDI is based on the premise of diminishing returns from income for human development using an explicit formulation for the diminishing return. A well-known and frequently used form is the Atkinson formulation for the utility of income:

$$W(y) = \frac{1}{1-\epsilon} \times y^{1-\epsilon}$$

Here, $W(y)$ is the utility or well-being derived from income, and the parameter measures the extent of diminishing returns. It is the elasticity of the marginal utility of income with respect to income. If $\epsilon=0$ there are no diminishing returns. As ϵ approaches 1, the equation becomes:

$$W(y) = \log y$$

The value of ϵ rises slowly in the HDI as income rises. For this purpose, the full range of income is divided into multiples of the poverty line y^* . Thus, most countries are between 0 and y^* , some between y^* and $2y^*$, even fewer between $2y^*$ and $3y^*$ and so on. For all countries for which $y < y^*$ —that is, the poor countries— ϵ is set

equal to 0. There are no diminishing returns here. For income between y^* and $2y^*$, ϵ is set equal to 1/2. For income between $2y^*$ and $3y^*$, ϵ is set at 2/3. In general, if $a y^* \leq y \leq (a+1) y^*$, then $\epsilon = a / (a+1)$. This gives:

$$\begin{aligned} W(y) &= y \text{ for } 0 < y \leq y^* \\ &= y^* + 2(y - y^*)^{\frac{1}{2}} + 3(y - 2y^*)^{\frac{1}{3}} \text{ for } y^* \leq y \leq 2y^* \\ &= y^* + 2(y^*)^{\frac{1}{2}} + 3(y - 2y^*)^{\frac{1}{3}} \text{ for } 2y^* \leq y \leq 3y^* \end{aligned}$$

So, the higher the income relative to the poverty level, the more sharply the diminishing returns affect the contribution of income to human development. Income above the poverty line thus has a marginal effect, but not a full dollar-for-dollar effect. This marginal effect is enough, however, to differentiate significantly among industrial countries. This method does not take $\epsilon = 1$, but allows it to vary between 0 and 1.

For example, Singapore has a real GDP per capita of \$15,108. With the poverty line set at \$4,829, there are four terms in the equation to determine the well-being of Singapore:

$$\begin{aligned} W(y) &= y^* + 2(y^*)^{\frac{1}{2}} + 3(y - 2y^*)^{\frac{1}{3}} + 4(y - 3y^*)^{\frac{1}{4}} \\ &= 4,829 + 2(4,829)^{\frac{1}{2}} \\ &\quad + 3(4,829)^{\frac{1}{3}} \\ &\quad + 4(15,108 - 14,487)^{\frac{1}{4}} \\ &= 4,829 + 139 + 51 + 20 = \$5,039 \end{aligned}$$

In calculating the HDI of Singapore using the improved variables and applying the methods described here, the following steps are taken:

Maximum country life expectancy	= 78.6
Minimum country life expectancy	= 42.0
Maximum country educational attainment	= 3.00
Minimum country educational attainment	= 0.00
Maximum country adjusted real GDP per capita	= 5,079
Minimum country adjusted real GDP per capita	= 380
Singapore life expectancy	= 74.0
Singapore educational attainment	= 2.04

Singapore adjusted GDP per capita	= 5.039
Singapore life expectancy deprivation = (78.6 – 74.0)/(78.6 – 42.0)	= 0.126
Singapore educational attainment deprivation = (3.00 – 2.04)/(3.00 – 0.00)	= 0.320
Singapore GDP deprivation = (5,079 – 5,039)/(5,079 – 380)	= 0.009
Singapore average deprivation = (0.126 + 0.320 + 0.009)/3	= 0.152
Singapore human development index HDI = 1 – 0.152	= 0.848

Making the HDI gender-sensitive

Of the many inequalities in human development, the most striking is that along gender lines. Women typically live longer than men once they have gone beyond the age when differential treatment of boys and girls makes life shorter for girls. They work harder and more hours than men, but they often do work that is unpaid or underpaid. Women cook, take care of children, the elderly and the sick, look after the upkeep of the house and work on the farm or in the shop. Only a small proportion of women find that their work gets paid and recorded as participation in the labour force. Labour force participation as a concept and in its measurement grossly understates

women's work even in the productive, commodity-producing sphere. It completely leaves out much work that is useful to the continuing existence of the household.

Any attempt to measure gender inequalities is thus bound to err on the low side. Even allowing for that, the inequalities are striking. An attempt is made here to calculate the ratio of female income to male income. We do not have suitable data on income, but for 33 countries we do have comparable data on the relative wage ratios and the relative ratios for labour force participation.

These data reveal a remarkable pattern of discrimination. The female-male wage ratio for these 33 countries ranges from a low of 50% (Japan) to a high of 89% (Sweden).

In labour force participation, the lowest female-male ratio is 40% (Costa Rica) and the highest is 92% (Sweden). Multiplying these two ratios gives the female-male wage-income ratio.

This wage-income ratio combines two identifiable correlates of gender discrimination. The male wage is greater than the female wage, and the gap in labour force participation rates is even wider. When this is translated into absolute income levels, we see the profound consequences. To do this, a basic assumption has to be made that is clearly gender-biased: that the ratio of non-wage income to wage income is the same for men and women.

TECHNICAL NOTE TABLE 1.1

Gender-sensitive HDI

	Female as % of male				Female HDI	Male HDI	Gender-sensitive HDI	Percentage difference between HDI and gender-sensitive HDI
	Life expectancy ^a	Educational attainment	Adjusted real GDP	Human development index				
Sweden	101.13	100.11	81.90	96.16	0.825	0.857	0.938	-3.8
Norway	102.14	100.48	69.54	93.48	0.814	0.870	0.914	-6.5
Finland	103.80	99.63	68.33	94.47	0.781	0.826	0.900	-5.5
France	104.16	100.48	60.97	92.72	0.798	0.860	0.899	-7.3
Denmark	101.21	99.93	70.56	92.20	0.775	0.841	0.879	-7.8
Australia	102.26	99.28	62.33	90.48	0.790	0.873	0.879	-9.5
New Zealand	101.53	101.96	61.69	89.95	0.756	0.841	0.851	-10.0
Canada	102.48	98.21	50.05	85.73	0.781	0.911	0.842	-14.3
USA	102.97	100.72	48.73	86.26	0.771	0.893	0.842	-13.7
Netherlands	102.12	101.82	49.73	86.26	0.769	0.891	0.835	-13.7
Belgium	102.25	100.35	52.47	86.57	0.744	0.860	0.822	-13.4
Austria	103.14	96.07	53.57	86.47	0.740	0.856	0.822	-13.5
United Kingdom	101.02	100.54	51.55	85.09	0.752	0.884	0.819	-14.9
Czechoslovakia	103.83	97.52	61.35	90.25	0.692	0.766	0.810	-9.8
Germany	102.06	96.36	48.37	83.32	0.736	0.883	0.796	-16.7
Switzerland	102.07	97.41	40.65	80.92	0.752	0.929	0.790	-19.1
Italy	102.22	100.64	47.31	83.82	0.702	0.838	0.772	-16.2
Japan	100.81	99.66	33.88	77.56	0.743	0.958	0.761	-22.4
Portugal	102.69	86.02	57.67	83.36	0.617	0.741	0.708	-16.6
Luxembourg	102.46	100.21	29.16	74.88	0.661	0.883	0.695	-25.1
Ireland	100.86	102.48	30.43	74.89	0.658	0.878	0.689	-25.1
Greece	102.68	89.14	38.18	76.10	0.632	0.831	0.686	-23.9
Cyprus	100.06	88.62	35.51	72.32	0.639	0.883	0.659	-27.7
Hong Kong	100.58	75.47	39.79	71.10	0.635	0.893	0.649	-28.9
Singapore	101.09	80.50	39.54	70.87	0.557	0.785	0.601	-29.1
Costa Rica	99.76	104.4	26.31	70.61	0.583	0.826	0.595	-29.4
Korea, Rep. of	102.42	80.84	27.46	65.53	0.548	0.836	0.571	-34.5
Paraguay	100.04	96.49	67.43	88.82	0.457	0.515	0.566	-11.2
Sri Lanka	99.63	83.70	46.49	79.59	0.478	0.601	0.518	-20.4
Philippines	99.52	98.64	35.41	78.67	0.396	0.503	0.472	-21.3
Swaziland	100.68	96.27	43.23	68.74	0.193	0.280	0.315	-31.3
Myanmar	99.31	73.78	57.67	74.07	0.210	0.283	0.285	-25.9
Kenya	100.24	52.78	54.00	58.60	0.147	0.251	0.215	-41.4

a. Adjusted for natural biological life expectancy advantage for females.

This ratio therefore understates the inequality.

In adjusted real GDP per capita, female incomes as a percentage of male incomes range from a low of 26% (Costa Rica) to a high of 82% (Sweden). But of the 33 countries for which we have comparable data, only nine have a ratio of 60% or above, while 10 are below 40%. So, even in a statistic that understates the inequality, the differences are stark.

The female HDI gains from the near-equal or better ratio in life expectancy but loses somewhat from unequal access to education, particularly in the developing countries. In education, the developed countries show very little gender difference: though the value for female achievement, as a proportion of male, never goes above 102%, in five countries it goes below 98%. In poorer countries the differences become substantial. Women's educational attainment in Kenya shows a low ratio of 53%. In Myanmar it is 74%, and in Hong Kong 75%. Costa Rica shows a figure of well over 100%.

The overall HDI for men and women calculated separately reflects this pattern. Much of the data, 22 of the 33 countries, relate to the industrial countries. So, technical note table 1.1 does not capture the full extent of gender inequality. Even then, the female HDI as a percentage of the male HDI is as low as 59% in Kenya, 66% in the Republic of Korea and 69% in Swaziland. Of the 33 countries, 10 have ratios below 75%, and only five countries—Sweden, Finland, Norway, France and Denmark—have ratios of over 90%. No country attains full gender equality even in this biased measure, though Sweden comes close with a ratio of 96%.

How should this inequality be reflected in the overall HDI for any country? A simple approach is to multiply the overall HDI for any country by the ratio of female-to-male HDI. If a country has full equality, its HDI is unaffected. Although Japan has the second highest overall HDI (0.981), its low female-to-male ratio brings it down to being 18th of the 33 countries with a gender-adjusted HDI of 0.761. Sweden, by contrast, has a very high female-to-male ratio and moves from fifth to first position with a gender-adjusted HDI of 0.938. Whereas Japan has a high overall HDI with a high degree of gender inequality, Sweden has a high overall HDI with a low degree of gender inequality. Among the 11 developing countries, there is usually both a low HDI and a high degree of gender inequality.

Adjusting the HDI for income distribution

The HDI is a national average, just like real income per capita, one of its components. The use of any such overall average hides the considerable differences in the distribution of the basic indicators, whether by gender, race, region, ethnicity or simply among individuals. The HDI therefore needs to be made sensitive to these distributions.

The HDI has the advantage that two of its three basic variables—life expectancy and educational attainment—are naturally distributed much less unequally than is income, the third variable. Thus, life expectancy in any population is not likely to be distributed more unequally than, say, three to one. A rich person cannot live a thousand times longer than a poor person, though their

incomes may be in that ratio. Across countries, the range of life expectancy is 42 to 79, less than 2:1.

The same is true in educational attainment. The range of the percentage of adults who are literate varies from 18% to 99%, a range of under 6:1. Mean years of schooling show a variation from 0.1 to 12.3, more unequal than life expectancy, and hide even greater variations in the within-country distribution.

Apart from per capita income, all the variables used in the HDI have an obvious maximum. Life expectancy

TECHNICAL NOTE TABLE 1.2
Income-distribution-adjusted HDI

	HDI value	Income-distribution-adjusted HDI value	Percentage difference between HDI and income-distribution-adjusted HDI
Japan	0.981	0.979	-0.26
Netherlands	0.968	0.964	-0.34
Sweden	0.976	0.957	-1.97
Switzerland	0.977	0.957	-2.09
Norway	0.978	0.956	-2.37
Canada	0.982	0.947	-3.68
Belgium	0.950	0.944	-0.67
USA	0.976	0.943	-3.44
United Kingdom	0.962	0.943	-2.03
France	0.969	0.936	-3.53
Australia	0.971	0.933	-4.04
Finland	0.953	0.931	-2.32
Denmark	0.953	0.923	-3.23
Israel	0.939	0.913	-2.93
New Zealand	0.947	0.909	-4.11
Ireland	0.921	0.904	-1.88
Spain	0.916	0.894	-2.49
Italy	0.922	0.890	-3.51
Korea, Rep. of	0.871	0.884	1.44
Hungary	0.893	0.878	-1.68
Hong Kong	0.913	0.871	-4.82
Singapore	0.848	0.835	-1.57
Yugoslavia	0.857	0.833	-2.90
Costa Rica	0.842	0.820	-2.75
Chile	0.863	0.817	-5.59
Portugal	0.850	0.799	-6.30
Argentina	0.833	0.792	-5.20
Venezuela	0.824	0.771	-6.91
Mauritius	0.793	0.744	-6.59
Mexico	0.804	0.736	-9.22
Malaysia	0.789	0.731	-7.93
Colombia	0.758	0.722	-5.07
Panama	0.731	0.648	-12.91
Thailand	0.685	0.644	-6.43
Brazil	0.739	0.635	-16.38
Jamaica	0.722	0.631	-14.37
Sri Lanka	0.651	0.623	-4.5
Syrian Arab Rep.	0.665	0.617	-7.83
Turkey	0.671	0.608	-10.34
Philippines	0.600	0.572	-4.94
Tunisia	0.582	0.566	-2.81
Iran, Islamic Rep. of	0.547	0.510	-7.37
Indonesia	0.491	0.495	0.75
El Salvador	0.498	0.483	-3.18
Honduras	0.473	0.420	-12.84
Egypt	0.385	0.373	-3.01
Kenya	0.366	0.341	-7.28
Pakistan	0.305	0.297	-2.56
Zambia	0.315	0.292	-7.75
India	0.297	0.278	-6.66
Côte d'Ivoire	0.289	0.249	-16.07
Bangladesh	0.185	0.168	-9.95
Nepal	0.168	0.136	-23.20

TECHNICAL NOTE TABLE 1.3

Changing HDI over time

	HDI 1970	HDI 1990	Difference		HDI 1970	HDI 1990	Difference
Saudi Arabia	0.386	0.687	0.301	Iran, Islamic Rep. of	0.464	0.547	0.083
Korea, Rep. of	0.589	0.871	0.282	Dominican Rep.	0.513	0.595	0.082
Mauritius	0.525	0.793	0.268	Uruguay	0.799	0.880	0.081
Malaysia	0.538	0.789	0.251	Ireland	0.840	0.921	0.081
Tunisia	0.335	0.582	0.247	Pakistan	0.226	0.305	0.079
Syrian Arab Rep.	0.432	0.665	0.233	Sri Lanka	0.573	0.651	0.078
Botswana	0.319	0.534	0.215	Côte d'Ivoire	0.212	0.289	0.077
Turkey	0.492	0.671	0.179	Haiti	0.200	0.276	0.076
Indonesia	0.316	0.491	0.176	Guatemala	0.416	0.485	0.069
Gabon	0.370	0.545	0.175	Ghana	0.246	0.310	0.064
Algeria	0.358	0.533	0.175	Hungary	0.831	0.893	0.063
Brazil	0.569	0.739	0.170	Czechoslovakia	0.836	0.897	0.061
Morocco	0.268	0.429	0.161	Philippines	0.542	0.600	0.058
Jordan	0.428	0.586	0.158	Senegal	0.124	0.178	0.054
Hong Kong	0.762	0.913	0.151	Nigeria	0.189	0.241	0.052
Thailand	0.535	0.685	0.150	USSR	0.821	0.873	0.051
Colombia	0.617	0.758	0.141	Bulgaria	0.815	0.865	0.050
Portugal	0.710	0.850	0.139	Argentina	0.784	0.833	0.049
Yemen	0.093	0.232	0.139	Togo	0.170	0.218	0.048
Israel	0.806	0.939	0.133	Poland	0.829	0.874	0.045
Mexico	0.675	0.804	0.129	Nepal	0.126	0.168	0.042
Japan	0.853	0.981	0.128	India	0.258	0.297	0.039
USA	0.848	0.976	0.128	Liberia	0.194	0.227	0.033
Chile	0.736	0.863	0.128	Madagascar	0.292	0.325	0.033
Canada	0.860	0.982	0.123	Zimbabwe	0.365	0.397	0.032
Australia	0.849	0.971	0.122	Paraguay	0.607	0.637	0.031
Singapore	0.730	0.848	0.119	Zaire	0.232	0.262	0.030
France	0.854	0.969	0.116	Burundi	0.135	0.165	0.030
Finland	0.838	0.953	0.115	Panama	0.703	0.731	0.028
Switzerland	0.863	0.977	0.114	Mali	0.054	0.081	0.028
Kenya	0.253	0.366	0.113	Somalia	0.061	0.088	0.027
United Kingdom	0.850	0.962	0.113	Niger	0.054	0.078	0.024
Austria	0.838	0.950	0.112	Angola	0.147	0.169	0.023
Venezuela	0.715	0.824	0.109	Central African Rep.	0.138	0.159	0.021
Greece	0.793	0.901	0.108	Malawi	0.149	0.166	0.017
Norway	0.870	0.978	0.108	El Salvador	0.483	0.498	0.015
Lesotho	0.317	0.423	0.106	Bolivia	0.383	0.394	0.012
Belgium	0.846	0.950	0.104	Bangladesh	0.174	0.185	0.011
Sweden	0.873	0.976	0.103	Chad	0.083	0.088	0.006
Netherlands	0.866	0.968	0.101	Peru	0.595	0.600	0.004
Yugoslavia	0.757	0.857	0.100	Sudan	0.155	0.157	0.002
Iraq	0.489	0.589	0.100	Sierra Leone	0.060	0.062	0.002
Ecuador	0.542	0.641	0.100	Rwanda	0.184	0.186	0.002
New Zealand	0.848	0.947	0.098	Burkina Faso	0.073	0.074	0.001
Egypt	0.286	0.385	0.098	Myanmar	0.384	0.385	0.000
Spain	0.819	0.916	0.098	Benin	0.117	0.111	-0.006
Congo	0.278	0.372	0.095	Zambia	0.320	0.315	-0.006
Trinidad and Tobago	0.784	0.876	0.093	Afghanistan	0.083	0.065	-0.019
Italy	0.830	0.922	0.092	Papua New Guinea	0.342	0.321	-0.021
Iceland	0.866	0.958	0.091	Guinea	0.074	0.052	-0.022
Denmark	0.864	0.953	0.089	Uganda	0.241	0.192	-0.049
Honduras	0.385	0.473	0.088	Mozambique	0.205	0.153	-0.052
Luxembourg	0.841	0.929	0.088	Nicaragua	0.549	0.496	-0.053
Cameroon	0.228	0.313	0.085	Romania	0.798	0.733	-0.065
Costa Rica	0.759	0.842	0.084	Jamaica	0.797	0.722	-0.076

will rarely go beyond 100, literacy never beyond 100% and mean years of schooling seldom beyond, say, 15. Income, however, has no upper bound. For GNP per capita the intercountry range is \$80 to \$29,880, a range of 375:1. As for real GDP per capita, the range is \$380 to \$20,998, or 55:1. Such inequalities in income are reproduced just as sharply within countries.

So, a high average value for life expectancy or educational attainment can be obtained only by a reasonably equitable spread among individuals, a result of the fixed maximum possible. Although it is of great interest to know the distributions of those variables, an average is a better statistic for these variables than for income, where it can

be very misleading.

The ranking of countries by per capita income could be adjusted if per capita income were multiplied by a factor indicating distributional inequality—1 minus the Gini coefficient. This method can be extended to all the countries having statistics on distributional inequality. Some 41 countries have data on the ratio of the income share of the highest 20% to the lowest 20%. Of these 41 countries, 17 have data on the Gini coefficient as well, and there was found to be a very strong association between the two—the logarithm of the ratio being a good predictor of the Gini coefficient. This regression result was used to interpolate the Gini coefficient for the remaining 24

countries. Some countries had data only on the Gini coefficient. In all, 53 countries with directly estimated or interpolated Gini coefficients were available.

A word of caution. The Gini coefficients are registered for various years between 1975 and 1988, and the ratios of the top 20% to the lowest 20% are for years between 1980 and 1988. This is not a serious problem, since these coefficients are unlikely to change quickly. But the Gini coefficient is not always truly representative of the entire country. It is sometimes only for a subsection, such as the urban population.

Adjusted income was multiplied by $(1 - G)$ with G being the Gini coefficient to modify income even further. Because this was done for the adjusted income, $W(y)$, rather than for the actual income, the diminishing return effect could be incorporated before the distributional adjustment modifies incomes further. This modified income $W(y)[1 - G]$ is then used as the third variable in addition to life expectancy and educational attainment to compute a distribution-adjusted HDI.

For all but two countries, the HDI is reduced by making it sensitive to income distribution, and in a half of them, it is reduced by 4% or more. This is particularly marked in the developing countries, where 24 of the 32 developing countries have a reduction of 4% or more and seven show a reduction in excess of 10%.

Much better data are needed to pursue the sensitivity of income distribution more thoroughly. The analysis shows that caution is needed in interpreting a country's HDI value as a measure of achieved well-being for all its people.

Measuring progress in human development over time

The human development index (HDI) ranks countries relative to each other for a particular period. The maximum and minimum values that define the maximum distance to be travelled for each variable are specific to that year. Over time, the actual achieved values of life expectancy, literacy and income change, as will the maximum and minimum values of these variables across all countries.

For example, Ruritania's life expectancy in year 1 may be 40, halfway between a minimum of 20 and a maximum of 60. By year 10, Ruritania may have improved its life expectancy to 50, but the minimum may now be 30 and the maximum 80. In such a case, the numerical value of the index indicating Ruritania's life expectancy will drop in the HDI calculations from $0.5 [(40 - 20) / (60 - 20)]$ to $0.4 [(50 - 30) / (80 - 30)]$, despite the 25% improvement in life expectancy.

So, improvements in the components of human development in any country over time may be reflected as a decline in its HDI value, if in the meantime its relative position has deteriorated. To combine a measure of progress over time with intercountry comparisons at one point of time, the HDI has to be modified.

The way to tackle this problem, without changing the logic of the HDI, is to say that the minimum and maximum should be defined, not for each point of time, but over a period of time. Thus if we are measuring progress between 1970 and 1990, the minimum would be the minimum of all values of, say, life expectancy for all

countries over the 20 years. Similarly for the maximum. The distance to be travelled is thus stretched out as the maximum over the 20-year period.

In the example of Ruritania, the minimum stays at 20 but the maximum is now 80. In year 1, the life expectancy variable is $0.33 [(40 - 20) / (80 - 20)]$, and in year 10 it is $0.5 [(50 - 20) / (80 - 20)]$.

With this adaptation, the human development index becomes comparable over time as well as across countries. The difference in the value of the human development index over time can be shown to be a weighted sum of the growth rates in the three variables: the weights are given by the ratio of the initial value of a variable to the maximum range.

To express this algebraically—with X_1 as life expectancy, X_2 as literacy and X_3 as income—the contribution of each variable to the HDI can be written as Z_{ijt} where:

$$Z_{ijt} = \frac{[X_{ijt} - \min_{it} X_{ij}]}{[\max_{it} X_{ij} - \min_{it} X_{ij}]}$$

In the formula, j denotes country, t the time period. Note now that the denominator will remain unchanged for all time periods and for all countries.

$$MHDI_{jt} = \frac{1}{3} \sum Z_{ijt}$$

MHDI stands for the modified HDI since we have a new definition of the maximum and minimum. Countries are ranked by the size of the difference between the 1970 and 1990 values for the *MHDI*. These differences range from 0.301 for Saudi Arabia to -0.076 for Jamaica. Jamaica is, however, a country where the HDI in 1970 was already quite high, 0.797, and the lack of change does not reflect absolute deterioration.

A summary of the differences between the 1970 and 1990 HDI values follows:

HDI difference	Number of countries
> 0.300	1
0.250 to 0.299	3
0.200 to 0.249	3
0.150 to 0.199	9
0.100 to 0.149	27
0.050 to 0.099	29
0.000 to 0.049	28
< 0.000	10
Total	110

At the bottom, with Jamaica, are 10 countries that register a negative change, and above them is a group of 28 countries that register a change between 0 and 0.049. Twenty-one of these 38 countries are from Sub-Saharan Africa, seven from Latin America and seven from Asia. These low achievers are usually countries with a comparatively low initial HDI value. Only Poland (0.829 in 1970), Romania (0.798) Jamaica (0.797) and Argentina (0.784) would qualify as such. The remainder are poor initially, and 23 of them remained below 0.300 in 1990. Many of these countries experienced low rates of growth of real GDP per capita over this period, or even had a negative growth. So, income growth may not be sufficient for achieving a high HDI, but it cannot be dispensed with.

Fifty-six countries show a moderate improvement, between 0.05 and 0.15, 16 show a greater improvement and 43 show a total increase in excess of 0.10. Since the maximum distance to traverse is 1.00, some 40% of the countries, starting at different levels, covered 10% or more of the maximum distance. Almost all the countries

with high HDIs in 1990 are in this group. They have continued to improve despite their already high levels for 1970. But, a few countries in this fast-moving group began in 1970 with low levels of HDI, notably Yemen (0.093 in 1970), Kenya (0.253), Morocco (0.268) and Indonesia (0.316).

2. Measurement of global economic disparity

A standard practice, though possible for relatively few countries and only infrequently updated, is to distribute a country's income according to quintile groups of households ranked by total household or per capita income. Data along these lines are available for 41 countries in table 30 of the *1991 World Development Report*.

We have tried to adapt this national quintile approach to the world by ranking countries according to their per capita income and presenting them in the form of a continuum of population—with the population accumulated in a way similar to designing a population sample frame for a country. The world is then divided into quintiles, and the attributes of each quintile are calculated.

In technical note table 2.1, the first column is the estimated GNP per capita in ascending order, the second column is the population, the third column is the cumulative population, and the fourth column is the cumulative population percentile.

A problem arises because countries are not units, and the quintile break will not necessarily occur at or near a point between two countries. This can be seen in the break between the first and second quintiles, where India straddles the two, between the second and third quintile where China straddles the two, and between the fourth and fifth quintiles where the former USSR straddles the two. Accordingly, the three straddling countries have been divided along the quintile break with the same GNP per capita but with different populations reflecting this break.

The average GNP per capita for each quintile is given in column 1 of technical note table 2.4 at the end of each group, and columns 5, 6, 7 and 8 give the wealth, trade, domestic investment, and domestic savings pertaining to each group—in absolute terms and as a percentage of global wealth, trade, domestic investment, and domestic savings. The income disparity between the top

and bottom quintiles is 59 to 1, and the other economic disparities are even greater.

Each country is treated as one unit with an average per capita income, and the analysis is based on comparisons of the average per capita incomes of rich and poor countries. In reality, of course, there are wide disparities within each country between rich and poor people as can be seen from table 30 of the *1991 World Development Report* table referred to at the beginning of this note.

We tried to estimate what effect it would have on our analysis if we could produce a global economic disparity table that measures the income differences both between countries and within countries. This is possible to do with the 41 countries in the *World Development Report* table.

In technical note table 2.2, we treat the universe as limited to these 41 countries and apply the same methodology as we did in table 2.1. The income disparity between the top and bottom quintiles is 65 to 1. We then divide each country into its own quintiles and treat our 41-country world as if it were 205 countries, each country having five parts. We apply the same methodology to this 205-country world technical note table 2.3. Apart from some fascinating glimpses into the comparative wealth of rich quintiles in poor countries and poor quintiles in rich countries, the most significant result is that the income disparity between the top and bottom quintiles increases from 65 to 1 to as much as 140 to 1—that is, it more than doubles.

The industrial countries, where income disparities tend to be smaller, are overrepresented in our 41/205 country universe, and it is reasonable to assume that, if we were able to do this analysis of inequality between and within countries for the world, the global disparity ratio would be higher still. The inequality ratio for the world is probably at least three times higher than the inequality ratio in technical note table 2.1 and may be well over 150 to 1.

TECHNICAL NOTE FIGURE 2.1
Beyond national averages

The population of 41 countries is divided into quintiles of average per capita income...

■ Developing country □ Industrial country

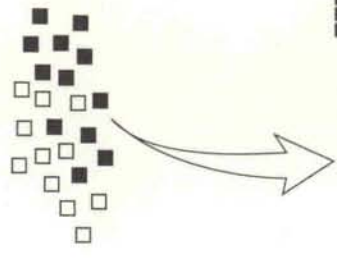


Bars show equal numbers of people in each quintile

In each of the 41 countries the population is divided into quintiles of income...

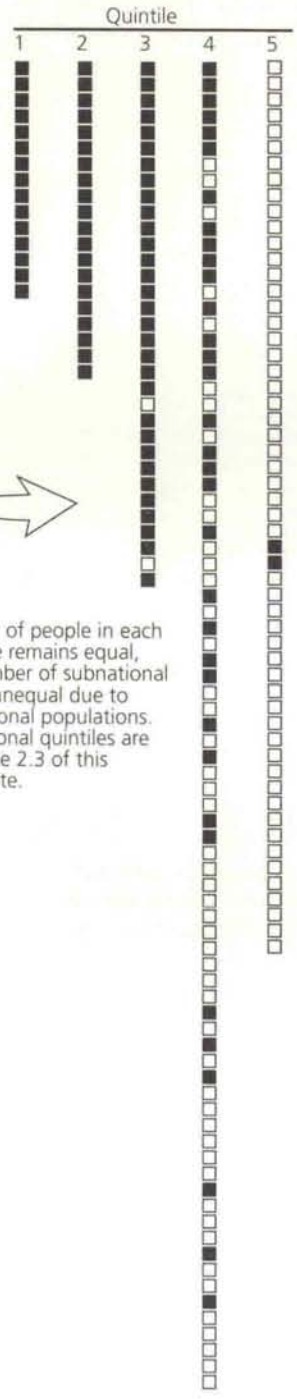
- 1 Poorest
 - 2
 - 3
 - 4
 - 5 Richest
- one country

The 205 subnational quintiles are then redistributed into quintiles of per capita income.



The number of people in each new quintile remains equal, but the number of subnational quintiles is unequal due to sizes of national populations. The subnational quintiles are listed in table 2.3 of this technical note.

Subnational quintiles grouped into quintiles of average per capita income



TECHNICAL NOTE TABLE 2.1
Global economic disparities, 1989

	GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)	Cumulative global wealth (US\$ billions)	Cumulative global trade (US\$ billions)	Cumulative global domestic investment (US\$ billions)	Cumulative global domestic savings (US\$ billions)
Poorest 20%	262				276.3 (1.40%)	56.1 (0.95%)	54.9 (1.25%)	42.7 (0.98%)
Mozambique	80	15.7	16	0.3	1.3	0.8	0.4	-0.24
Ethiopia	120	49.2	65	1.2	7.2	2.3	1.2	0.06
Cambodia	130	8.2	73	1.4	8.2	2.5	1.4	0.13
Tanzania, U. Rep. of	130	27.3	100	1.9	11.8	3.6	2.1	-0.05
Somalia	170	7.5	108	2.0	13.1	3.8	2.4	-0.23
Bangladesh	180	115.6	224	4.2	33.9	8.6	4.9	-0.02
Bhutan	180	1.5	225	4.3	34.1	8.8	5.0	0.03
Guinea-Bissau	180	1.0	226	4.3	34.3	8.9	5.0	0.04
Lao People's Dem. Rep.	180	4.1	230	4.4	35.1	9.0	5.1	0.03
Malawi	180	8.8	239	4.5	36.6	9.7	5.4	0.09
Nepal	180	19.1	258	4.9	40.1	10.5	6.0	0.33
Chad	190	5.7	264	5.0	41.2	11.1	6.1	0.19
Afghanistan	200	16.6	280	5.3	44.5	12.3	6.7	0.41
Myanmar	200	41.7	322	6.1	52.8	12.7	8.1	1.6
Burundi	220	5.5	327	6.2	54.0	13.0	8.3	1.6
Sierra Leone	220	4.2	332	6.3	54.9	13.3	8.4	1.7
Viet Nam	220	66.7	398	7.5	69.6	16.3	10.7	2.6
Madagascar	230	12.0	410	7.8	72.4	16.9	11.1	2.9
Gambia	240	0.9	411	7.8	72.6	17.2	11.1	2.9
Nigeria	250	108.5	520	9.8	99.7	29.8	14.7	8.6
Uganda	250	18.8	538	10.2	104.4	30.7	15.3	8.7
Zaire	260	35.6	574	10.9	113.6	35.0	16.5	10.1
Mali	270	9.2	583	11.0	116.1	35.8	17.1	10.4
Niger	290	7.7	591	11.2	118.4	36.4	17.4	10.5
Burkina Faso	320	9.0	600	11.4	121.3	36.9	17.9	10.5
Rwanda	320	7.2	607	11.5	123.6	37.3	18.3	10.7
Equatorial Guinea	330	0.4	608	11.5	123.7	37.4	18.3	10.7
Guyana	340	0.8	608	11.5	124.0	37.8	18.3	10.7
Sao Tome and Principe	340	0.1	609	11.5	124.0	37.8	18.3	10.7
India I	340	447.9	1,056	20.0	276.3	56.1	54.9	42.7
Second 20%	346				365.0 (1.85%)	80.2 (1.35%)	114.9 (2.62%)	110.7 (2.53%)
India II	340	405.2	1,462	27.7	414.0	72.6	87.9	71.6
China II	350	649.3	2,111	40.0	641.3	136.2	169.8	153.4
Third 20%	427				453.1 (2.30%)	149.9 (2.53%)	128.3 (2.92%)	113.1 (2.59%)
China III	350	489.8	2,601	40.0	812.7	184.2	231.5	215.1
Haiti	360	6.5	2,607	49.3	815.1	184.8	231.8	215.3
Kenya	360	24.0	2,631	49.8	823.7	188.0	233.9	217.0
Pakistan	370	122.6	2,754	52.1	869.1	199.8	242.1	222.0
Benin	380	4.6	2,759	52.2	870.9	200.3	242.2	222.1
Central African Rep.	390	3.0	2,762	52.3	872.0	200.5	242.3	222.1
Ghana	390	15.0	2,777	52.6	877.9	202.5	243.1	222.4
Togo	390	3.5	2,780	52.6	879.3	203.2	243.3	222.6
Zambia	390	8.5	2,789	52.8	882.6	205.4	243.6	222.8
Maldives	420	0.2	2,789	52.8	882.7	205.5	243.7	222.8
Guinea	430	5.8	2,795	52.9	885.1	206.4	244.1	223.2
Sri Lanka	430	17.2	2,812	53.2	892.5	210.2	245.7	224.1
Liberia	450	2.6	2,814	53.3	893.7	210.8	245.8	224.3
Comoros	460	0.6	2,815	53.3	894.0	210.9	245.8	224.3
Lesotho	470	1.8	2,817	53.3	894.8	211.4	246.4	223.9
Djibouti	480	0.4	2,817	53.3	895.0	211.8	246.4	223.9
Sudan	480	25.2	2,842	53.8	907.1	213.7	247.2	223.6
Indonesia	500	184.3	3,027	57.3	999.2	251.8	279.5	257.7
Mauritania	500	2.0	3,029	57.3	1,000.2	252.5	279.6	257.7
Solomon Islands	580	0.3	3,029	57.3	1,000.4	252.7	279.7	257.8
Angola	610	10.0	3,039	57.5	1,006.5	256.0	280.8	259.0
Bolivia	620	7.3	3,046	57.7	1,011.1	257.4	281.4	259.4
Egypt	640	52.4	3,099	58.6	1,044.6	267.4	289.4	261.8
Senegal	650	7.3	3,106	58.8	1,049.4	269.2	290.1	262.3
Yemen	650	11.7	3,118	59.0	1,057.0	270.8	291.7	261.2
Zimbabwe	650	9.7	3,127	59.2	1,063.3	273.2	293.0	262.5
Samoa	700	0.2	3,127	59.2	1,063.4	262.5
Philippines III	710	43.7	3,171	60.0	1,094.4	286.1	298.0	266.5

	GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)	Cumulative global wealth (US\$ billions)	Cumulative global trade (US\$ billions)	Cumulative global domestic investment (US\$ billions)	Cumulative global domestic savings (US\$ billions)
Fourth 20%	2,203				2,319.6 (11.75%)	825.8 (13.94%)	555.4 (12.65%)	584.9 (13.39%)
Philippines IV	710	18.7	3,190	60.4	1,107.7	291.7	300.2	268.3
Cape Verde	780	0.4	3,190	60.4	1,108.0	291.8	300.2	268.3
Côte d'Ivoire	790	12.0	3,202	60.6	1,117.5	197.2	301.2	269.6
Dominican Rep.	790	7.2	3,209	60.7	1,123.1	300.3	302.6	270.6
Nicaragua	830	3.9	3,213	60.8	1,126.3	301.6	303.3	270.5
Vanuatu	860	0.1	3,213	60.8	1,126.5	301.6	303.3	270.5
Lebanon	880	2.7	3,216	60.9	1,128.9	304.6	303.8	271.0
Mongolia	880	2.2	3,218	60.9	1,130.8	306.0	304.2	271.5
Morocco	880	25.1	3,243	61.4	1,152.8	314.8	309.5	275.6
Papua New Guinea	890	3.9	3,247	61.5	1,156.3	317.6	310.3	276.0
Honduras	900	5.1	3,252	61.6	1,160.9	319.7	310.9	276.5
Swaziland	900	0.8	3,253	61.6	1,161.6	320.5	311.1	276.7
Guatemala	910	9.2	3,262	61.7	1,170.0	321.2	312.2	277.3
Congo	940	2.3	3,265	61.8	1,172.1	322.7	312.5	277.8
Syrian Arab Rep.	980	12.5	3,277	62.0	1,184.4	327.8	314.1	280.7
Cameroon	1,000	11.8	3,289	62.3	1,196.2	330.0	316.2	282.9
Peru	1,010	21.6	3,311	62.7	1,218.0	335.5	320.6	287.7
Ecuador	1,020	10.6	3,321	62.9	1,228.8	339.8	323.0	289.9
Namibia	1,030	1.8	3,323	62.9	1,230.6	341.6	323.3	290.2
Paraguay	1,030	4.3	3,327	63.0	1,235.0	342.8	324.2	290.8
El Salvador	1,070	5.3	3,332	63.1	1,240.7	344.6	325.1	291.2
Albania	1,200	3.2	3,336	63.1	1,244.5	345.2	326.0	292.0
Colombia	1,200	33.0	3,369	63.8	1,284.1	356.0	333.9	301.5
Saint Vincent	1,200	0.1	3,369	63.8	1,284.3	356.1	333.9	301.5
Thailand	1,220	55.7	3,425	64.8	1,352.2	401.9	355.0	321.2
Korea, Dem. Rep. of	1,240	21.8	3,446	65.2	1,379.2	407.4	360.9	326.9
Jamaica	1,260	2.5	3,449	65.3	1,382.3	410.2	361.8	327.7
Tunisia	1,260	8.2	3,457	65.4	1,392.6	417.5	364.2	329.7
Turkey	1,370	55.9	3,513	66.5	1,469.2	444.9	381.0	345.7
Botswana	1,600	1.3	3,514	66.5	1,471.2	447.3	381.5	346.5
Jordan	1,640	4.0	3,518	66.6	1,477.8	450.4	382.7	346.4
Fiji	1,650	0.8	3,519	66.6	1,479.1	451.1	383.0	346.6
Dominica	1,680	0.1	3,519	66.6	1,479.2	451.3	383.0	346.7
Belize	1,720	0.2	3,519	66.6	1,479.5	451.6	383.1	346.7
Panama	1,760	2.4	3,522	66.7	1,483.8	452.8	383.2	347.2
Chile	1,770	13.2	3,535	66.9	1,507.1	467.5	387.9	352.8
Costa Rica	1,780	3.0	3,538	67.0	1,512.5	470.6	389.2	353.9
Poland	1,790	38.4	3,576	67.7	1,581.2	493.8	411.9	376.6
Saint Lucia	1,810	0.1	3,576	67.7	1,581.5	494.1	411.9	376.7
Grenada	1,900	0.1	3,576	67.7	1,581.7	494.2	412.0	376.7
Mauritius	1,990	1.1	3,578	67.7	1,583.9	496.5	412.6	377.2
Cuba	2,000	10.6	3,588	67.9	1,605.1	509.6	417.3	381.6
Mexico	2,010	88.6	3,677	69.6	1,783.1	554.7	447.5	413.7
Argentina	2,160	32.3	3,709	70.2	1,853.0	568.5	455.9	426.9
Malaysia	2,160	17.9	3,727	70.5	1,891.6	616.0	467.5	440.1
Algeria	2,230	25.0	3,752	71.0	1,947.3	633.0	484.8	457.3
Bulgaria	2,320	9.0	3,761	71.2	1,968.2	660.0	491.4	463.6
Venezuela	2,450	19.7	3,781	71.6	2,016.5	680.8	497.7	476.7
South Africa	2,470	35.3	3,816	72.2	2,103.7	711.2	516.0	499.3
Brazil	2,540	150.4	3,966	75.1	2,485.6	763.9	600.1	598.6
Romania	2,560	23.3	3,990	75.5	2,545.2	787.9	613.2	611.1
Hungary	2,590	10.6	4,000	75.7	2,572.5	806.3	620.3	619.3
Uruguay	2,620	3.1	4,003	75.8	2,580.6	809.1	621.0	620.5
Saint Kitts and Nevis	2,630	0.0	4,003	75.8	2,580.7	809.2	621.0	620.6
Yugoslavia	2,920	23.8	4,027	76.2	2,650.2	837.4	654.4	657.4
Gabon	2,960	1.2	4,028	76.2	2,653.7	839.5	655.3	658.6
Suriname	3,010	0.4	4,029	76.3	2,655.0	840.3	655.6	658.8
Iraq	3,020	18.9	4,048	76.6	2,712.1	862.7	668.1	670.8
Iran, Islamic Rep. of	3,200	54.6	4,102	77.6	2,886.9	885.2	720.6	719.8
Trinidad and Tobago	3,230	1.3	4,103	77.7	2,891.0	888.0	721.3	720.8
Czechoslovakia	3,450	15.7	4,119	78.0	2,945.1	916.8	736.5	737.0
Antigua and Barbuda	3,690	0.1	4,119	78.0	2,945.3	917.1	736.5	737.1
Seychelles	4,230	0.1	4,119	78.0	2,945.6	917.2	736.6	737.2
Portugal	4,250	10.3	4,130	78.2	2,989.3	949.1	749.7	746.3
Korea, Rep. of	4,400	42.8	4,172	79.0	3,177.6	1,072.7	815.6	816.0
USSR IV	4,550	51.9	4,224	80.0	3,414.0	1,111.9	853.4	851.5

Global economic disparities, 1989

	GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)	Cumulative global wealth (US\$ billions)	Cumulative global trade (US\$ billions)	Cumulative global domestic investment (US\$ billions)	Cumulative global domestic savings (US\$ billions)
Richest 20%	15,411				16,321.9 (82.70%)	4,813.0 (81.23%)	3,537.7 (80.56%)	3,518.3 (80.51%)
USSR V	4,550	236.7	4,461	84.4	4,490.8	1,290.7	1,025.7	1,013.0
Oman	5,220	1.5	4,462	84.5	4,498.6	1,296.9	1,028.1	1,016.4
Libya	5,310	4.5	4,467	84.5	4,522.7	1,308.7	1,033.6	1,021.7
Greece	5,350	10.0	4,477	84.7	4,576.5	1,332.2	1,043.3	1,026.5
Malta	5,830	0.4	4,477	84.7	4,578.5	1,334.3	1,043.8	1,027.0
Saudi Arabia	6,020	14.1	4,492	85.0	4,663.6	1,382.0	1,061.6	1,044.8
Bahrain	6,340	0.5	4,492	85.0	4,666.9	1,386.9	1,062.4	1,045.5
Barbados	6,350	0.3	4,492	85.0	4,668.5	1,387.6	1,062.8	1,045.9
Cyprus	7,040	0.7	4,493	85.0	4,673.5	1,390.3	1,063.9	1,047.0
Ireland	8,710	3.7	4,497	85.1	4,705.9	1,428.4	1,070.7	1,056.4
Spain	9,330	39.2	4,536	85.9	5,071.5	1,544.2	1,162.1	1,136.8
Israel	9,790	4.6	4,541	85.9	5,116.5	1,568.0	1,169.3	1,142.2
Hong Kong	10,350	5.9	4,546	86.0	5,177.1	1,668.9	1,185.7	1,163.4
Singapore	10,450	2.7	4,549	86.1	5,205.5	1,763.1	1,195.6	1,175.6
Bahamas	11,320	0.2	4,549	86.1	5,208.3	1,765.5	1,196.3	1,176.3
New Zealand	12,070	3.4	4,553	86.2	5,249.2	1,782.9	1,209.4	1,187.7
Australia	14,360	16.9	4,570	86.5	5,491.5	1,855.9	1,272.4	1,243.4
United Kingdom	14,610	57.2	4,627	87.6	6,327.8	2,206.0	1,448.0	1,394.0
Italy	15,120	57.1	4,684	88.7	7,190.5	2,496.2	1,655.0	1,592.4
Brunei Darussalam	15,390	0.2	4,684	88.7	7,194.2	2,499.1	1,655.9	1,593.2
Qatar	15,500	0.4	4,684	88.7	7,199.9	2,502.3	1,657.2	1,594.5
Netherlands	15,920	15.0	4,699	88.9	7,437.9	2,714.3	1,702.4	1,649.2
Kuwait	16,150	2.0	4,701	89.0	7,470.9	2,732.1	1,708.7	1,659.4
Belgium	16,220	9.8	4,711	89.2	7,630.6	2,932.2	1,740.6	1,694.6
Austria	17,300	7.6	4,719	89.3	7,761.8	3,003.5	1,776.0	1,731.3
France	17,820	56.1	4,775	90.4	8,762.1	3,366.2	1,986.1	1,951.4
United Arab Emirates	18,430	1.6	4,777	90.4	8,791.4	3,390.8	1,993.4	1,963.1
Canada	19,030	26.5	4,803	90.9	9,296.1	3,618.1	2,109.5	2,079.2
Germany	20,440	77.6	4,881	92.4	10,881.7	4,227.3	2,458.3	2,507.3
Denmark	20,450	5.1	4,886	92.5	10,986.9	4,281.9	2,478.3	2,531.5
USA	20,910	249.2	5,135	97.2	16,198.1	5,120.4	3,260.0	3,208.9
Iceland	21,070	0.3	5,135	97.2	16,203.5	5,123.4	3,261.2	3,210.1
Sweden	21,570	8.4	5,144	97.4	16,385.6	5,223.8	3,301.3	3,250.2
Finland	22,120	5.0	5,149	97.5	16,495.7	5,271.7	3,334.3	3,281.0
Norway	22,290	4.2	5,153	97.5	16,589.5	5,322.3	3,359.7	3,311.0
Japan	23,810	123.5	5,276	99.9	19,529.1	5,804.7	4,329.7	4,310.5
Luxembourg	24,980	0.4	5,277	99.9	19,538.5	5,815.3	4,331.9	4,312.5
Switzerland	29,880	6.6	5,283	100.0	19,735.9	5,924.9	4,391.1	4,369.8

TECHNICAL NOTE TABLE 2.2

GNP per capita distribution, 1988: 41 countries with income distribution data

	GNP per capita (US\$)	Population global (millions)	Cumulative percentile (%)	Cumulative population (%)
Poorest 20%	301			
Bangladesh	170	115.6	116	4.6
India I	340	388.2	504	20.0
Second 20%	341			
India II	340	464.9	969	38.6
Pakistan II	350	36.8	1,005	40.0
Third 20%	684			
Pakistan III	350	85.8	1,091	43.4
Ghana	400	15.0	1,106	44.0
Sri Lanka	420	17.2	1,124	44.7
Indonesia	440	184.3	1,308	52.1
Philippines	630	62.4	1,370	54.5
Côte d'Ivoire	770	12.0	1,382	55.0
Morocco	830	25.1	1,407	56.0
Guatemala	900	9.2	1,417	56.4
Botswana	1,010	1.3	1,418	56.4
Jamaica	1,070	2.5	1,420	56.5
Colombia	1,180	33.0	1,453	57.8
Peru	1,300	21.6	1,475	58.7
Costa Rica	1,690	3.0	1,478	58.8
Poland	1,860	38.4	1,516	60.3
Fourth 20%	8,018			
Malaysia	1,940	17.9	1,534	61.1
Brazil	2,160	150.4	1,684	67.0
Hungary	2,460	10.6	1,695	67.5
Yugoslavia	2,520	23.8	1,719	68.4
Venezuela	3,250	19.7	1,739	69.2
Spain	7,740	39.2	1,778	70.8
Israel	8,650	4.6	1,782	70.9
Singapore	9,070	2.7	1,785	71.0
Hong Kong	9,220	5.9	1,791	71.3
New Zealand	10,000	3.4	1,794	71.4
Australia	12,340	16.9	1,811	72.1
United Kingdom	12,810	57.2	1,868	74.4
Italy	13,330	57.1	1,926	76.6
Belgium	14,490	9.8	1,935	77.0
Netherlands	14,520	15.0	1,950	77.6
France	16,090	56.1	2,006	79.9
Richest 20%	19,542	2,513		
Germany	16,570	77.6	2,084	82.9
Canada	16,960	26.5	2,111	84.0
Denmark	18,450	5.1	2,116	84.2
Finland	18,590	5.0	2,121	84.4
Sweden	19,300	8.4	2,129	84.7
United States	19,840	249.2	2,378	94.7
Norway	19,990	4.2	2,383	94.8
Japan	21,020	123.5	2,506	99.7
Switzerland	27,500	6.6	2,513	100.0

GNP per capita distribution, 1988: 41 countries by 20% income shares

	GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)		GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)
Poorest 20%	163								
Bangladesh 1	88	23.1	23	0.9	Côte d'Ivoire 4	820	2.4	1,449	57.7
Sri Lanka 1	101	3.4	27	1.1	Guatemala 4	842	1.8	1,451	57.7
Bangladesh 2	117	23.1	50	2.0	Morocco 4	888	5.0	1,456	57.9
Botswana 1	126	0.3	50	2.0	Peru 3	891	4.3	1,460	58.1
Ghana 1	130	3.0	53	2.1	Ghana 5	892	3.0	1,463	58.2
Pakistan 1	136	24.5	77	3.1	Malaysia 2	898	3.6	1,467	58.4
India 1	138	170.6	248	9.9	Poland 1	902	7.7	1,474	58.7
Bangladesh 3	147	23.1	271	10.8	Indonesia 5	909	36.9	1,511	60.1
Philippines 1	173	12.5	284	11.3					
Sri Lanka 2	179	3.4	287	11.4	Fourth 20%	4,984			
Bangladesh 4	182	23.1	310	12.3	Botswana 4	1,020	0.3	1,511	60.2
Côte d'Ivoire 1	191	2.4	313	12.4	Costa Rica 3	1,115	0.6	1,512	60.2
Indonesia 1	194	36.9	350	13.9	Jamaica 4	1,133	0.5	1,513	60.2
Pakistan 2	196	24.5	374	14.9	Brazil 3	1,156	30.1	1,543	61.4
India I-2	209	128.0	502	20.0	Sri Lanka 5	1,179	3.4	1,546	61.5
					Colombia 4	1,227	6.6	1,553	61.8
					Poland 2	1,321	7.7	1,560	62.1
Second 20%	295				Hungary 1	1,338	2.1	1,562	62.2
India II-2	209	42.7	545	21.7	Malaysia 3	1,344	3.6	1,566	62.3
Ghana 2	218	3.0	548	21.8	Yugoslavia 2	1,377	4.8	1,571	62.5
Colombia 1	236	6.6	554	22.1	Peru 4	1,398	4.3	1,575	62.7
Guatemala 1	248	1.8	556	22.1	Venezuela 2	1,495	3.9	1,579	62.8
Sri Lanka 3	255	3.4	560	22.3	Philippines 5	1,512	12.5	1,592	63.3
Brazil 1	259	30.1	590	23.5	Morocco 5	1,635	5.0	1,597	63.5
Pakistan 3	269	24.5	614	24.4	Poland 3	1,674	7.7	1,604	63.8
Indonesia 2	273	36.9	651	25.9	Costa Rica 4	1,749	0.6	1,605	63.9
India 3	277	170.6	822	32.7	Hungary 2	1,879	2.1	1,607	64.0
Costa Rica 1	279	0.6	822	32.7	Brazil 4	2,009	30.1	1,637	65.2
Peru 1	286	4.3	827	32.9	Côte d'Ivoire 5	2,029	2.4	1,639	65.2
Jamaica 1	288	0.5	827	32.9	Malaysia 4	2,053	3.6	1,643	65.4
Philippines 2	306	12.5	840	33.4	Yugoslavia 3	2,078	4.8	1,648	65.6
Côte d'Ivoire 2	306	2.4	842	33.5	Poland 4	2,130	7.7	1,655	65.9
Ghana 3	314	3.0	845	33.6	Venezuela 3	2,275	3.9	1,659	66.0
Bangladesh 5	317	23.1	868	34.5	Hungary 3	2,298	2.1	1,662	66.1
Botswana 2	328	0.3	868	34.6	Singapore 1	2,322	0.5	1,662	66.1
Indonesia 3	352	36.9	905	36.0	Guatemala 5	2,475	1.8	1,664	66.2
Pakistan 4	360	24.5	930	37.0	Hong Kong 1	2,489	1.2	1,665	66.3
India II-4	374	75.1	1,005	40.0	New Zealand 1	2,550	0.7	1,666	66.3
					Israel 1	2,595	0.9	1,667	66.3
					Jamaica 5	2,631	0.5	1,667	66.4
Third 20%	628								
India III-4	374	95.5	1,100	43.8	Spain 1	2,671	7.8	1,675	66.7
Sri Lanka 4	387	3.4	1,104	43.9	Australia 1	2,715	3.4	1,678	66.8
Guatemala 2	387	1.8	1,106	44.0	Hungary 4	2,802	2.1	1,680	66.9
Morocco 1	407	5.0	1,111	44.2	Botswana 5	2,980	0.3	1,681	66.9
Malaysia 1	442	3.6	1,114	44.3	Yugoslavia 4	2,985	4.8	1,686	67.1
Ghana 4	446	3.0	1,117	44.5	Colombia 5	3,127	6.6	1,692	67.3
Philippines 3	466	12.5	1,130	45.0	Poland 5	3,274	7.7	1,700	67.7
Indonesia 4	473	36.9	1,167	46.4	Peru 5	3,374	4.3	1,704	67.8
Côte d'Ivoire 3	504	2.4	1,169	46.5	Venezuela 4	3,494	3.9	1,708	68.0
Colombia 2	513	6.6	1,176	46.8	United Kingdom 1	3,715	11.4	1,719	68.4
Jamaica 2	529	0.5	1,176	46.8	Hungary 5	3,983	2.1	1,722	68.5
Morocco 2	540	5.0	1,181	47.0	Singapore 2	4,499	0.5	1,722	68.5
Guatemala 3	549	1.8	1,183	47.1	Italy 1	4,532	11.4	1,734	69.0
Peru 2	553	4.3	1,187	47.2	Costa Rica 5	4,605	0.6	1,734	69.0
Botswana 3	596	0.3	1,187	47.3	USA 1	4,662	49.8	1,784	71.0
Brazil 1	616	30.1	1,217	48.5	Canada 1	4,834	5.3	1,789	71.2
Morocco 3	681	5.0	1,223	48.7	Spain 2	4,838	7.8	1,797	71.5
Philippines 4	693	12.5	1,235	49.2	Malaysia 5	4,963	3.6	1,801	71.7
Costa Rica 2	701	0.6	1,236	49.2	Hong Kong 2	4,979	1.2	1,802	71.7
India 5	704	170.6	1,406	56.0	Denmark 1	4,982	1.0	1,803	71.8
Venezuela 1	764	3.9	1,410	56.1	Netherlands 1	5,009	3.0	1,806	71.9
Yugoslavia 1	768	4.8	1,415	56.3	France 1	5,084	11.2	1,817	72.3
Jamaica 3	769	0.5	1,415	56.3	Israel 2	5,233	0.9	1,818	72.4
Colombia 2	797	6.6	1,422	56.6	Yugoslavia 5	5,392	4.8	1,823	72.5
Pakistan 5	798	24.5	1,447	57.6	New Zealand 2	5,400	0.7	1,823	72.6

	GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)		GNP per capita (US\$)	Population (millions)	Cumulative global population (millions)	Cumulative percentile (%)
Germany 1	5,617	15.5	1,839	73.2	Australia 4	15,302	3.4	2,136	85.0
Belgium 1	5,724	2.0	1,841	73.3	Spain 5	15,517	7.8	2,144	85.3
Finland 1	5,874	1.0	1,842	73.3	Italy 4	15,663	11.4	2,155	85.8
Norway 1	6,217	0.8	1,843	73.3	United Kingdom 4	16,013	11.4	2,166	86.2
Singapore 3	6,630	0.5	1,843	73.4	Switzerland 2	16,087	1.3	2,168	86.3
Spain 3	6,695	7.8	1,851	73.7	Sweden 3	16,791	1.7	2,169	86.3
Brazil 5	6,761	30.1	1,881	74.9	Denmark 3	16,974	1.0	2,171	86.4
Australia 2	6,849	3.4	1,885	75.0	Finland 3	17,121	1.0	2,172	86.4
Hong Kong 3	7,007	1.2	1,886	75.1	Israel 5	17,127	0.9	2,172	86.5
Switzerland 1	7,150	1.3	1,887	75.1	Netherlands 4	17,206	3.0	2,175	86.6
United Kingdom 2	7,366	11.4	1,899	75.6	Belgium 4	17,243	2.0	2,177	86.7
Israel 3	7,699	0.9	1,900	75.6	USA 3	17,261	49.8	2,227	88.6
Sweden 1	7,720	1.7	1,901	75.7	Japan 3	18,393	24.7	2,252	89.6
Italy 2	7,998	11.4	1,913	76.1	Norway 3	18,911	0.8	2,253	89.7
New Zealand 3	8,100	0.7	1,913	76.1	France 4	18,922	11.2	2,264	90.1
Venezuela 5	8,223	3.9	1,917	76.3	Germany 4	19,950	15.5	2,280	90.7
Spain 4	8,979	7.8	1,925	76.6	Canada 4	20,861	5.3	2,285	90.9
Japan 1	9,144	24.7	1,950	77.6	Hong Kong 5	21,667	1.2	2,286	91.0
Netherlands 2	9,583	3.0	1,953	77.7	Singapore 5	22,185	0.5	2,287	91.0
Singapore 2	9,714	0.5	1,953	77.7	New Zealand 5	22,350	0.7	2,287	91.0
France 2	9,751	11.2	1,965	78.2	Switzerland 3	22,550	1.3	2,289	91.1
Belgium 2	9,926	2.0	1,966	78.3	Denmark 4	23,616	1.0	2,290	91.1
Hong Kong 4	9,958	1.2	1,968	78.3	Sweden 4	23,643	1.7	2,291	91.2
Canada 2	10,006	5.3	1,973	78.5	Finland 4	23,721	1.0	2,292	91.2
Germany 2	10,505	15.5	1,988	79.1	Japan 4	24,278	24.7	2,317	92.2
Israel 4	10,596	0.9	1,989	79.2	USA 4	24,800	49.8	2,367	94.2
Australia 3	10,798	3.4	1,993	79.3	United Kingdom 5	25,300	11.4	2,378	94.7
USA IV-2	10,912	17.4	2,010	80.0	Norway 4	25,307	0.8	2,379	94.7
Richest 20%	22,808	2,513			Australia 5	26,037	3.4	2,382	94.8
USA V-2	10,912	32.4	2,043	81.3	Belgium 5	26,082	2.0	2,384	94.9
Denmark 2	11,070	1.0	2,044	81.3	Italy 5	27,327	11.4	2,396	95.4
Italy 3	11,131	11.4	2,055	81.8	Netherlands 5	27,806	3.0	2,399	95.5
Finland 2	11,266	1.0	2,056	81.8	Switzerland 4	30,388	1.3	2,400	95.5
New Zealand 4	11,600	0.7	2,057	81.9	Germany 5	32,046	15.5	2,416	96.1
United Kingdom 3	11,657	11.4	2,068	82.3	France 5	32,840	11.2	2,427	96.6
Sweden 2	12,738	1.7	2,070	82.4	Canada 5	34,090	5.3	2,432	96.8
Norway 2	12,814	0.8	2,071	82.4	Finland 5	34,968	1.0	2,433	96.8
Netherlands 3	12,995	3.0	2,074	82.5	Denmark 5	35,609	1.0	2,434	96.9
Belgium 3	13,476	2.0	2,076	82.6	Sweden 5	35,609	1.7	2,436	96.9
France 3	13,853	11.2	2,087	83.1	Norway 5	36,702	0.8	2,437	97.0
Japan 2	13,873	24.7	2,112	84.0	Japan 5	39,413	24.7	2,461	98.0
Germany 3	14,731	15.5	2,127	84.7	USA 5	41,565	49.8	2,511	99.9
Canada 3	15,010	5.3	2,132	84.9	Switzerland 5	61,325	1.3	2,513	100.0

3. Sources of data on political freedom

The attempt at measuring political freedom presented in chapter 2 of this Report draws on a wide range of empirical data sources. The most important ones are listed in the annex to this note.

There is no doubt that future work in the area of human development and political freedom will have to be based on a much broader selection of data sources in order to ensure a full, comprehensive picture of the current trends and the differences in perspective that may exist in various regions, cultures and societies.

In particular, it would be necessary in future years to identify more regional data sources and to take also into account relevant government reports. The latter may become an increasingly important source of information given the fact that, as stated in chapter 2, a growing number of countries have been setting up national bodies to deal with human rights issues.

It would also be important in the future to include the data sources that not only document human rights violations but also analyse positive achievements of governments in the area of human rights and political freedom conditions.

There is no doubt that the study of the methodologies of measuring political freedom is only in its initial phase. Further research is needed, as well as more extensive and objective sources of data.

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