

# Reexamination of the Human Development Index

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## 人間開発指数の再検討

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### Abstract

The year 2010 was the 20th anniversary of the Human Development Index (HDI) and rather large modifications were added in the indicators and the calculation methodology of the HDI. This paper reviews the historical changes in the HDI and examines the characteristics of the new HDI calculation methodologies.

### 要 旨

2010 年は人間開発指数誕生 20 周年の節目の年であり、人間開発指数の各開発指標および算出方法に比較的大きな改訂が施された。本稿では、人間開発指数の歴史的変遷を振り返ると共に、新しい人間開発指数の算出方法の妥当性について考察する。

## 1 Introduction

Human development is defined as a process of enlarging people's choices (UNDP 1990, p. 1). It is based on the idea that the real wealth of a nation lies in its people, and the basic objective of development is not only to achieve growths in income but to create an enabling environment for people to enjoy long, healthy, and creative lives. As economic growth is necessary but not sufficient for human development, we need to consider various aspects of the populace such as health condition, level of education, and social exclusion when we evaluate the levels of human development of nations or individuals.

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Such views that regard human development as a multidimensional concept rather than a unidimensional one can be found in pioneering literatures from the 1950's (e.g. Lewis (1955)). However, Amartya Sen's capability approach (Sen, 1985, pp.9-16) seems to be one of the most influential works in this field. It emphasizes that the well-being of a person should be evaluated by what an individual actually does rather than what he or she has. After the capability approach, there has been a lot of works elaborating on the concept and measurement of human development.

Another influential work in this field is the Human Development Index (HDI) launched by the United Nations Development Programme (UNDP) in 1990. The HDI, rooted in the concept of the capability approach, is a composite index describing the level of human development for countries around the world. The UNDP annually publishes the HDI values and its rankings in their annual report known as the Human Development Report (HDR). Twenty years after its inception, the HDI is now one of the most widely consulted measures of human development.

Though the basic concept and the calculation methodology for the HDI have not changed significantly since its beginnings, slight modifications have been added over the past twenty years. Moreover, in 2010, the 20th anniversary of the HDI and the HDR, rather large modifications were added in the indicators and the calculation method of the HDI. Why were these modifications added? Are the characteristics of the new calculation methodology appropriate for the measure of human development? This paper reviews the history of the HDI and examines the characteristics of the new HDI calculation methodology.

The rest of this paper is organized as follows. The next section reviews the history of the HDI from 1990 to 2010. Section 3 compares the calculation methodologies of the new and old HDI and examines the characteristics of the new HDI. The final section provides concluding remarks.

## 2 The History of the HDI

The UNDP publishes the HDI values and its rankings annually in the Human Development Report. The annual HDR report is an independent publication commissioned by the UNDP. Every report presents an agenda such as 'Overcoming barriers: Human mobility and development (2009),' 'Beyond scarcity: Power, poverty and the global water crisis (2006),' and 'Human Rights and Human Development (2000),' with setting data and analysis and calls international attention to issues and policy options that put people at the center of strategies to meet the challenges of development.

**Table 1: Historical changes in indicators, maximum and minimum values**

	Life expectancy at birth (year)		Educational attainment (1)		Educational attainment (2)		Per capita income	
	Max	Min	Max	Min	Max	Min	Max	Min
1990	Actual observed value		Adult literacy rate (%)		—		Log of GDP per capita (PPP \$)	
			Actual observed value				Actual observed value	
1991-1993	Actual observed value		Adult literacy rate (%)		Mean years of schooling (years)		Adjusted GDP per capita (PPP \$)	
			Actual observed value		Actual observed value		Actual observed value	
1994	85	25	Adult literacy rate (%)		Mean years of schooling (years)		Adjusted GDP per capita (PPP \$)	
			100		0	15	0	40000
1995-1998	85	25	Adult literacy rate (%)		Combined gross enrolment ratio (%)		Adjusted GDP per capita (PPP \$)	
			100		0	15	0	40000
1999-2009	85	25	Adult literacy rate (%)		Combined gross enrolment ratio (%)		Log of GDP per capita (PPP \$)	
			100		0	100	0	40000
2010	Actual observed maximum value during 1980-2010	20	Mean years of schooling (years)		Expected years of schooling (years)		GNI per capita (PPP \$)	
			Actual observed maximum value during 1980-2010		0	Actual observed maximum value during 1980-2010	0	Actual observed maximum value during 1980-2010

Data sources: the Human Development Report 1990-2010

In the first HDR (the HDR 1990), the UNDP defined human development as a process of enlarging people's choices and launched the HDI. The definition of human development and the concept of the HDI are rooted in Sen's capability approach; thus, the HDI has been regarded as embodying the capability approach for the practical realization of the measurement of human development.

The HDI chose as essential aspects of human development three fundamental dimensions: a long, healthy life, educational attainment, and a decent standard of living. These fundamental dimensions have remained, however, the indicators that describe these dimensions and the calculation methodologies for measuring the achievement of these aspects has changed over the years. Table 1 summarizes the changes.

## 2.1 The Changes in Indicators

This subsection reviews the changes in the indicators adopted by the HDI. To describe the three fundamental dimensions, the first HDI in 1990 adopted three indicators; life expectancy at birth, the adult literacy rate and gross domestic product (GDP) per capita in purchasing power parity of US dollars. The long, healthy life indicator has been fixed during these past twenty years. On the other hand, the indicators describing educational attainment and standard of living have been modified in this period.

With respect to the indicators of educational attainment, in the second year of the HDI, namely in 1991, mean years of schooling<sup>1</sup> was added as an indicator describing educational attainment. The indicator describing educational attainment was a combined index of adult literacy rate and the mean value of years of schooling. The weight of the former was two thirds, and that of the latter was one third. From 1995 to 2009, the mean years of schooling was replaced with the combined gross enrollment ratio for primary, secondary, and tertiary schools. It was mainly because the formula for calculating mean years of schooling is complex and has enormous data requirements. Data on mean years of schooling is not provided by any UN agency or international organization. As a result, estimates must sometimes be used, which are not always acceptable. The combined enrollment ratio overcomes both these problems (UNDP 1995, p. 134). However, in 2010, mean years of schooling was adopted again, and this time, the indicator of expected years of schooling<sup>2</sup> is also adopted.

With respect to the indicator of income, the logarithm of GDP per capita or the adjusted GDP per capita<sup>3</sup> has been adopted from 1990 to 2009. In 2010, the GDP per capita indicator was replaced with gross national income (GNI) per capita<sup>4</sup>. This is because the ongoing surge of globalization in the world often effects large differences between the income of a country's residents and its domestic production. To capture the real economic situation of a country, GNI seems a more appropriate indicator than GDP.

## 2.2 The Changes in the Maximum and Minimum Value

The maximum values and the minimum values of each indicator that are used to calculate the HDI value have also been changed. From 1990 to 1994, the actual observed maximum and minimum values of each indicator in the year had been applied. However, if the maximum and minimum values change every year, then the HDI value of a country possibly changes even if the performance of the country has not changed at all. From this view-

<sup>1</sup> Average number of years of education received by people aged 25 and older in their lifetimes based on education attainment levels of the population converted into years of schooling based on theoretical durations of each level of education attended.

<sup>2</sup> Number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrollment rates were to stay the same throughout the child's life.

<sup>3</sup> The adjusted GDP is calculated by  $W(y) = \frac{1}{1-\varepsilon} \times y^{1-\varepsilon}$  where  $y$  denotes the GDP per capita. When  $y^*$  denotes the poverty line, if  $y \leq y^*$ , then  $\varepsilon = 0$  is applied and if  $y > y^*$ , then  $\varepsilon = 0.5$  is applied. See the HDR 1991 (UNDP 1991) for more detail.

<sup>4</sup> The definition of GNI per capita is as follows: Sum of value added by all resident producers in the economy plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad, divided by midyear population. GNI minus net receipts of primary income from abroad is GDP.

point, the fixed maximum and minimum values had been applied from 1994 to 2009. However, the change in maximum value does not affect the relative comparison (in percentage terms) between any two countries or periods of time. Therefore, in the HDR 2010 the maximum values were set to the actual observed maximum values of the indicators from the countries during 1980–2010. The minimum values will affect comparisons, so values that can be appropriately conceived of as subsistence values or “natural” zeros are used. Progress is thus measured against minimum levels that a society needs to survive over time. The minimum values are set at 20 years for life expectancy, at 0 years for both education variables and at \$163 for per capita gross national income (GNI). According to the HDR 2010, the life expectancy minimum is based on long-run historical evidence from Maddison (2010) and Riley (2005) and the income minimum \$163 is based on the lowest value attained by any country in recorded history (in Zimbabwe in 2008) that is regarded as necessity to ensure survival.

### 2.3 The Changes in the Calculation Methodologies

The methodology for calculating the HDI value is introduced annually in the Technical Note in the HDR. The basis of calculation has not changed from the beginning. To obtain the HDI value, we first calculate the index value of each indicator. Then, we combine the two index values for educational attainment into one education index value. Finally, we aggregate three index values, the life expectancy index, education index, and income index value, into an HDI index value.

The formula to calculate the index value of each indicator is as follows:

$$V_c^i = \frac{A_c^i - Min^i}{Max^i - Min^i}$$

Let  $V_c^i$  be an index value, where subscript  $c$  denotes a country and the superscript  $i$  denotes a development indicator such as the adult literacy rate. Hence  $V_c^i$  denotes an index value of an indicator  $i$  for country  $c$  and  $A_c^i$  denotes the actual value of an indicator  $i$  for country  $c$ . Let  $Max^i$  and  $Min^i$  be the maximum and minimum values corresponding to each  $i$  respectively.

With respect to education index, we need to combine two index values into one. The weight of the index value for educational attainment (1) is two thirds and for (2) is one third<sup>5</sup>.

<sup>5</sup> In 2010, geometric mean was applied to get the combined education index. That is,  $V_c^e = \frac{[edu_1 - edu_2]^{0.5} - Min^e}{Max^e - Min^e}$ .

Finally, we combine these three index values; that is, we combine the life expectancy index, education index, and income index values. From 1990 to 2009, the HDI value was a simple arithmetic mean of these three index values. However, in the HDR 2010, geometric mean was adopted for the first time. The characteristics of geometric mean are much different from those of arithmetic mean. How does this affect the HDI values and rankings? The next section makes a comparison of the new HDI produced by geometric mean and the old HDI produced by arithmetic mean using the data of the HDR 2010.

### 3 The Characteristics of the New HDI

The new aggregation method, namely geometric mean, results in substantial changes in the value and rank of the HDI for each country. Table 2 shows a comparison of the new and old aggregation methods, geometric mean and arithmetic mean, respectively. The table includes the values of each indicator, the HDI values and ranks produced by the new and old methods, and the differences of the HDI values and ranks between the new and old methods for 169 countries.

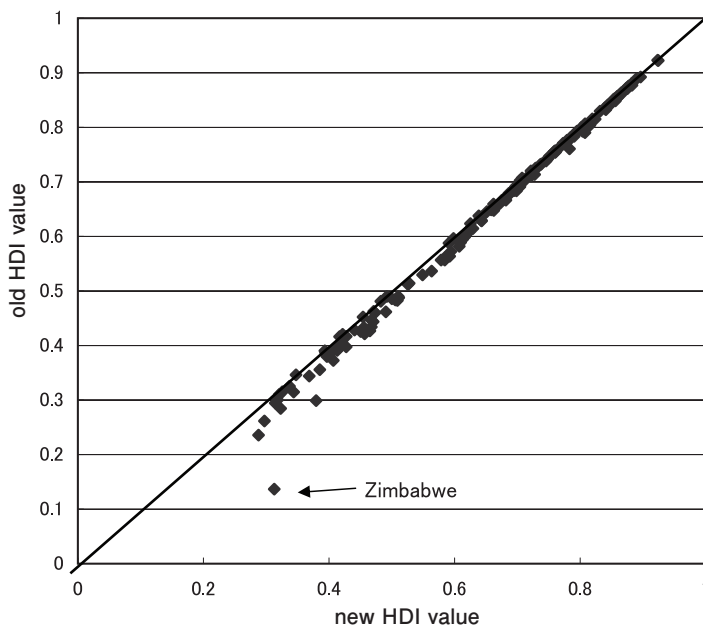
First of all, geometric mean is sensitive to the balance of variable size, and poor performance in any dimension is now directly reflected in the HDI. In addition, there is no longer perfect substitutability across dimensions. This method captures how well balanced a country's performance is across the three dimensions.

By definition, all countries achieve lower values by the new method compared to those of the old one because the value of geometric mean is always the same or smaller than that of arithmetic mean. As a remarkable point, the worse the balance among indicator values for a country, the larger the gap between the value of geometric mean and that of arithmetic mean. This is also caused by the properties of geometric and arithmetic mean.

As a whole, almost all the countries have only slight differences in the values between the new and old methodologies. With respect to the value difference, the smallest one is recorded by Norway at a value of 0.000 and the largest one is recorded by Zimbabwe at 0.176. Countries that achieve the worse balanced development across dimensions have the larger differences between new and old HDI values. With respect to the rank difference, the smallest value is -8 by Liberia (ranked at 164th in the new HDI but 156th in the old), and the biggest value is 7 by Cameroon (ranked at 131st in the new HDI but 138th in the old). The performance of Liberia is not well-balanced compared to other countries (Life expectancy, Mean years of schooling, Expected years of schooling, GNI) = (59.1, 3.9, 11.0,

320), though that of Cameroon is quite well-balanced (51.7, 5.9, 9.8, 2197). 46 countries out of 169 stay the same rank in both of the new and old HDI.

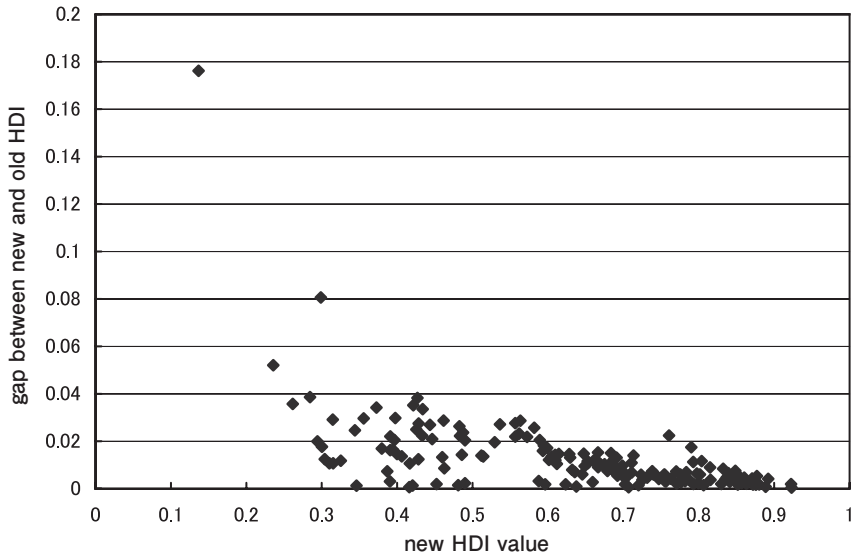
Figure 1 shows the scatter plots for the new and old HDI values. As mentioned, geometric mean always produces the same or lower index values compared to those produced by arithmetic mean, and all plots are located below the 45-degree line. Relatively unbalanced countries tend to have large gaps between the new and old HDI value, so they are located far below from the 45-degree line. For example, Zimbabwe, (Life expectancy, Mean years of schooling, Expected years of schooling, GNI) = (47.0, 7.2, 9.2, 176) has the largest gap 0.176, and it is located far below the 45-degree line.



Data source: the Human Development Report 2010

**Figure 1: Scatter plots (the new and old HDI)**

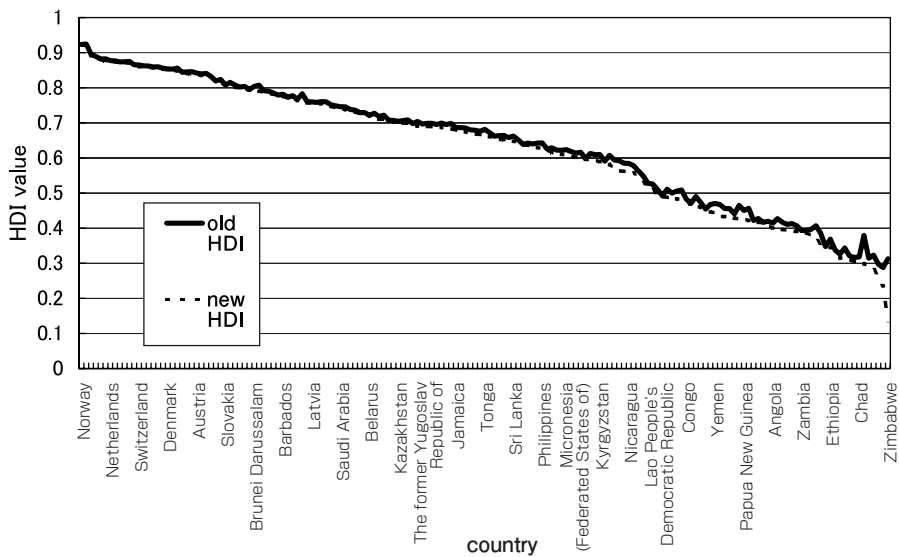
Figure 2 shows the scatter plots for the new HDI value and the gap of the new and old HDI values in 2010. There exists a low correlation between these two variables. This means that as the new HDI value gets greater, the gap tends to get smaller. This phenomenon is interpreted as follows. In general, developed countries have already achieved high values in all indicators, so these countries inevitably ended well-balanced among the indicators. On the other hand, developing countries have not achieved high values yet, so the indicator values of these countries tend to be spread and unbalanced.



Data source: the Human Development Report 2010

Figure 2: Scatter plots (the new HDI value, gap between the new and old HDI)

Figure 3, showing the new and old HDI values of each country, clears up this tendency. As the HDI values get smaller, the gaps between the new and old HDI values get large. From this viewpoint, the new HDI which evaluates the balance among indicators seems more severe for less developed countries. Is this characteristic appropriate for a human development measure?



Data source: the Human Development Report 2010

Figure 3: The new and old HDI values of each country



The processes of human development depend on countries. Some countries may achieve a well-balanced development, but other countries may not. If a country once experienced an unbalanced development, there is a possibility that the first developed dimension will lead the development of other dimensions. From this viewpoint, to highly value a good balance in development is not always appropriate. Further modification to evaluate unbalanced development as well is required.

## 4 Conclusion

This paper reviewed the historical changes in the HDI and examined the characteristics of the new and old calculation methodologies, geometric mean and arithmetic mean. It was shown that the new methodology is more severe for less developed countries in the sense that unbalanced development processes are not valued. In order to evaluate the possibility of development appropriately, further modifications are required. In addition, frequent changes in the indicators' calculation methodologies make it difficult to do time series comparison. From this viewpoint, stability in indicators and methodologies may be preferred by practitioners.

## References

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Table 2: The new and old Human Development Index

Country	Life expectancy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income (GNI) per capita (PPP \$)	HDI (new method)		HDI (old method)		Gap between the new and old HDI (old minus new)	
					value	rank	value	rank	value	rank
Norway	81.0	12.6	17.3	58810	0.923	1	0.923	2	0.000	1
Australia	81.9	12.0	20.5	38692	0.922	2	0.924	1	0.002	-1
New Zealand	80.6	12.5	19.7	25438	0.892	3	0.896	3	0.004	0
United States	79.6	12.4	15.7	47094	0.889	4	0.889	4	0.001	0
Ireland	80.3	11.6	17.9	33078	0.880	5	0.882	6	0.002	1
Liechtenstein	79.6	10.3	14.8	81011	0.877	6	0.882	5	0.005	-1
Netherlands	80.3	11.2	16.7	40658	0.876	7	0.877	7	0.002	0
Canada	81.0	11.5	16.0	38668	0.874	8	0.877	8	0.002	0
Germany	80.2	12.2	15.6	35308	0.872	9	0.874	11	0.002	2
Sweden	81.3	11.6	15.6	36936	0.871	10	0.874	10	0.003	0
Japan	83.2	11.5	15.1	34692	0.871	11	0.875	9	0.004	-2
Korea (Republic of)	79.8	11.6	16.8	29518	0.863	12	0.865	12	0.002	0
Switzerland	82.2	10.3	15.5	39849	0.860	13	0.865	13	0.005	0
Israel	81.2	11.9	15.6	27831	0.859	14	0.863	14	0.003	0
France	81.6	10.4	16.1	34341	0.858	15	0.862	15	0.004	0
Finland	80.1	10.3	17.1	33872	0.857	16	0.859	17	0.002	1
Iceland	82.1	10.4	18.2	22917	0.855	17	0.860	16	0.005	-1
Belgium	80.3	10.6	15.9	34873	0.853	18	0.856	19	0.003	1
Denmark	78.7	10.3	16.9	36404	0.852	19	0.854	20	0.002	1
Spain	81.3	10.4	16.4	29661	0.849	20	0.853	21	0.004	1
Hong Kong, China (SAR)	82.5	10.0	13.8	45090	0.849	21	0.856	18	0.008	-3
Greece	79.7	10.5	16.5	27580	0.841	22	0.844	24	0.003	2
Italy	81.4	9.7	16.3	29619	0.841	23	0.845	23	0.005	0
Luxembourg	79.9	10.1	13.3	51109	0.839	24	0.846	22	0.007	-2
Austria	80.4	9.8	15.0	37056	0.837	25	0.842	25	0.005	0
United Kingdom	79.8	9.5	15.9	35087	0.835	26	0.839	27	0.004	1
Singapore	80.7	8.8	14.4	48893	0.832	27	0.841	26	0.008	-1
Czech Republic	76.9	12.3	15.2	22678	0.830	28	0.832	28	0.002	0
Slovenia	78.8	9.0	16.7	25857	0.816	29	0.819	30	0.004	1
Andorra	80.8	10.4	11.5	38056	0.815	30	0.824	29	0.009	-1
Slovakia	75.1	11.6	14.9	21658	0.806	31	0.808	32	0.001	1
United Arab Emirates	77.7	9.2	11.5	58006	0.804	32	0.815	31	0.012	-1
Malta	80.0	9.9	14.4	21004	0.801	33	0.808	34	0.006	1
Estonia	73.7	12.0	15.8	17168	0.800	34	0.802	37	0.002	3
Cyprus	80.0	9.9	13.8	21962	0.798	35	0.804	35	0.006	0
Hungary	73.9	11.7	15.3	17472	0.793	36	0.795	38	0.002	2
Brunei Darussalam	77.4	7.5	14.0	49915	0.793	37	0.804	36	0.011	-1
Qatar	76.0	7.3	12.7	79426	0.790	38	0.808	33	0.017	-5

Table 2 (Continued)

Country	Life expectancy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income (GNI) per capita (PPP \$)	HDI (new method)		HDI (old method)		Gap between the new and old HDI (old minus new)	
					value	rank	value	rank	value	rank
Bahrain	76.0	9.4	14.3	26664	0.788	39	0.791	39	0.004	0
Portugal	79.1	8.0	15.5	22105	0.783	40	0.790	40	0.007	0
Poland	76.0	10.0	15.2	17803	0.782	41	0.785	41	0.003	0
Bahamas	74.4	11.1	11.6	25201	0.776	42	0.779	44	0.003	2
Barbados	77.7	9.3	13.4	21673	0.776	43	0.781	43	0.006	0
Lithuania	72.1	10.9	16.0	14824	0.771	44	0.773	46	0.002	2
Chile	78.8	9.7	14.5	13561	0.770	45	0.777	45	0.007	0
Argentina	75.7	9.3	15.5	14603	0.763	46	0.767	47	0.004	1
Kuwait	77.9	6.1	12.5	55719	0.761	47	0.783	42	0.022	-5
Montenegro	74.6	10.6	14.4	12491	0.757	48	0.761	48	0.004	0
Latvia	73.0	10.4	15.4	12944	0.757	49	0.760	51	0.003	2
Romania	73.2	10.6	14.8	12844	0.755	50	0.758	52	0.003	2
Croatia	76.7	9.0	13.8	16389	0.755	51	0.761	49	0.006	-2
Uruguay	76.7	8.4	15.7	13808	0.754	52	0.760	50	0.006	-2
Libyan Arab Jamahiriya	74.5	7.3	16.5	17068	0.747	53	0.751	53	0.004	0
Panama	76.0	9.4	13.5	13347	0.743	54	0.749	54	0.006	0
Saudi Arabia	73.3	7.8	13.5	24726	0.740	55	0.746	55	0.006	0
Mexico	76.7	8.7	13.4	13971	0.738	56	0.746	56	0.007	0
Malaysia	74.7	9.5	12.5	13927	0.733	57	0.738	57	0.005	0
Bulgaria	73.7	9.9	13.7	11139	0.732	58	0.736	58	0.005	0
Trinidad and Tobago	69.9	9.2	11.4	24233	0.725	59	0.729	60	0.004	1
Serbia	74.4	9.5	13.5	10449	0.724	60	0.729	59	0.006	-1
Belarus	69.6	9.3	14.6	12926	0.720	61	0.722	63	0.002	2
Costa Rica	79.1	8.3	11.7	10870	0.713	62	0.727	61	0.014	-1
Peru	73.7	9.6	13.8	8424	0.711	63	0.718	64	0.007	1
Albania	76.9	10.4	11.3	7976	0.711	64	0.722	62	0.011	-2
Russian Federation	67.2	8.8	14.1	15258	0.707	65	0.708	66	0.001	1
Azerbaijan	70.8	10.2	13.0	8747	0.702	66	0.707	67	0.004	1
Kazakhstan	65.4	10.3	15.1	10234	0.702	67	0.704	69	0.002	2
Ukraine	68.6	11.3	14.6	6535	0.699	68	0.707	68	0.007	0
Bosnia and Herzegovina	75.5	8.7	13.0	8222	0.699	69	0.709	65	0.010	-4
Iran (Islamic Republic of)	71.9	7.2	14.0	11764	0.692	70	0.698	75	0.005	5
Georgia	72.0	12.1	12.6	4902	0.691	71	0.704	70	0.013	-1
Mauritius	72.1	7.2	13.0	13344	0.690	72	0.697	76	0.007	4
The former Yugoslav Republic of Macedonia	74.5	8.2	12.3	9487	0.690	73	0.699	72	0.009	-1

Table 2 (Continued)

Country	Life expectan- cy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income (GNI) per capita (PPP \$)	HDI (new method)		HDI (old method)		Gap between the new and old HDI (old minus new)	
					value	rank	value	rank	value	rank
Venezuela (Bolivarian Republic of)	74.2	6.2	14.2	11846	0.689	74	0.699	73	0.009	-1
Brazil	72.9	7.2	13.8	10607	0.688	75	0.695	77	0.007	2
Armenia	74.2	10.8	11.9	5495	0.687	76	0.699	71	0.012	-5
Ecuador	75.4	7.6	13.3	7931	0.684	77	0.695	78	0.011	1
Belize	76.9	9.2	12.4	5693	0.684	78	0.699	74	0.015	-4
Jamaica	72.3	9.6	11.7	7207	0.679	79	0.686	80	0.008	1
Colombia	73.4	7.4	13.3	8589	0.678	80	0.687	79	0.009	-1
Tunisia	74.3	6.5	14.5	7979	0.675	81	0.685	81	0.010	0
Jordan	73.1	8.6	13.1	5956	0.670	82	0.680	83	0.010	1
Turkey	72.2	6.5	11.8	13359	0.668	83	0.679	84	0.011	1
Algeria	72.9	7.2	12.8	8320	0.666	84	0.676	85	0.009	1
Tonga	72.1	10.4	13.7	4038	0.666	85	0.682	82	0.015	-3
Fiji	69.2	11.0	13.0	4315	0.661	86	0.672	86	0.012	0
Turkmenistan	65.3	9.9	13.0	7052	0.659	87	0.662	90	0.003	3
Dominican Republic	72.8	6.9	11.9	8273	0.653	88	0.664	88	0.011	0
China	73.5	7.5	11.4	7258	0.653	89	0.664	87	0.012	-2
El Salvador	72.0	7.7	12.1	6498	0.649	90	0.658	91	0.010	1
Sri Lanka	74.4	8.2	12.0	4886	0.648	91	0.662	89	0.015	-2
Thailand	69.3	6.6	13.5	8001	0.645	92	0.652	92	0.006	0
Gabon	61.3	7.5	12.7	12747	0.638	93	0.639	97	0.001	4
Suriname	69.4	7.2	12.0	7093	0.636	94	0.643	94	0.007	0
Bolivia	66.3	9.2	13.7	4357	0.632	95	0.640	96	0.008	1
Paraguay	72.3	7.8	12.0	4585	0.629	96	0.643	95	0.013	-1
Philippines	72.3	8.7	11.5	4002	0.628	97	0.643	93	0.015	-4
Botswana	55.5	8.9	12.4	13204	0.623	98	0.625	99	0.002	1
Moldova (Republic of)	68.9	9.7	12.0	3149	0.614	99	0.629	98	0.015	-1
Mongolia	67.3	8.3	13.5	3619	0.612	100	0.622	101	0.010	1
Egypt	70.5	6.5	11.0	5889	0.610	101	0.622	102	0.012	1
Uzbekistan	68.2	10.0	11.5	3085	0.610	102	0.624	100	0.014	-2
Micronesia (Federated States of)	69.0	8.8	11.7	3266	0.605	103	0.619	103	0.014	0
Guyana	67.9	8.5	12.2	3302	0.601	104	0.613	105	0.012	1
Maldives	72.3	4.7	12.4	5408	0.599	105	0.616	104	0.017	-1
Namibia	62.1	7.4	11.8	6323	0.596	106	0.598	110	0.002	4
Honduras	72.6	6.5	11.4	3750	0.595	107	0.613	106	0.018	-1
Indonesia	71.5	5.7	12.7	3957	0.593	108	0.609	108	0.016	0
Kyrgyzstan	68.4	9.3	12.6	2291	0.589	109	0.610	107	0.021	-2
South Africa	52.0	8.2	13.4	9812	0.588	110	0.591	113	0.003	3

Table 2 (Continued)

Country	Life expectancy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income (GNI) per capita (PPP \$)	HDI (new method)		HDI (old method)		Gap between the new and old HDI (old minus new)	
					value	rank	value	rank	value	rank
Syrian Arab Republic	74.6	4.9	10.5	4760	0.582	111	0.607	109	0.026	-2
Tajikistan	67.3	9.8	11.4	2020	0.572	112	0.594	111	0.022	-1
Viet Nam	74.9	5.5	10.4	2995	0.563	113	0.592	112	0.029	-1
Morocco	71.8	4.4	10.5	4628	0.562	114	0.585	114	0.023	0
Nicaragua	73.8	5.7	10.8	2567	0.557	115	0.584	115	0.028	0
Guatemala	70.8	4.1	10.6	4694	0.557	116	0.578	116	0.022	0
Cape Verde	71.9	3.5	11.2	3306	0.536	117	0.563	117	0.027	0
Equatorial Guinea	51.0	5.4	8.1	22218	0.529	118	0.549	118	0.020	0
India	64.4	4.4	10.3	3337	0.514	119	0.528	119	0.014	0
Timor-Leste	62.1	2.8	11.2	5303	0.512	120	0.526	120	0.014	0
Lao People's Democratic Republic	65.9	4.6	9.2	2321	0.490	121	0.510	122	0.020	1
Swaziland	47.0	7.1	10.3	5132	0.490	122	0.492	126	0.002	4
Solomon Islands	67.0	4.5	9.1	2172	0.487	123	0.511	121	0.024	-2
Cambodia	62.2	5.8	9.8	1868	0.486	124	0.500	125	0.014	1
Sao Tome and Principe	66.1	4.2	10.2	1918	0.483	125	0.506	124	0.022	-1
Pakistan	67.2	4.9	6.8	2678	0.483	126	0.509	123	0.026	-3
Congo	53.9	5.9	9.3	3258	0.481	127	0.482	128	0.002	1
Kenya	55.6	7.0	9.6	1628	0.463	128	0.471	130	0.009	2
Bangladesh	66.9	4.8	8.1	1587	0.462	129	0.490	127	0.029	-2
Ghana	57.1	7.1	9.7	1385	0.460	130	0.473	129	0.013	-1
Cameroon	51.7	5.9	9.8	2197	0.452	131	0.454	138	0.002	7
Myanmar	62.7	4.0	9.2	1596	0.446	132	0.467	133	0.021	1
Yemen	63.9	2.5	8.6	2387	0.444	133	0.470	131	0.027	-2
Comoros	66.2	2.8	10.7	1176	0.434	134	0.467	132	0.034	-2
Benin	62.3	3.5	9.2	1499	0.433	135	0.455	137	0.022	2
Madagascar	61.2	5.2	10.2	953	0.429	136	0.456	136	0.027	0
Mauritania	57.3	3.7	8.1	2118	0.428	137	0.441	140	0.012	3
Nepal	67.5	3.2	8.8	1201	0.427	138	0.465	134	0.038	-4
Papua New Guinea	61.6	4.3	5.2	2227	0.426	139	0.450	139	0.025	0
Togo	63.3	5.3	9.6	844	0.421	140	0.457	135	0.035	-5
Lesotho	45.9	5.8	10.3	2021	0.420	141	0.422	143	0.001	2
Uganda	54.1	4.7	10.4	1224	0.417	142	0.427	141	0.011	-1
Nigeria	48.4	5.0	8.9	2156	0.416	143	0.417	146	0.001	3
Senegal	56.2	3.5	7.5	1816	0.406	144	0.420	144	0.014	0
Angola	48.1	4.4	4.4	4941	0.400	145	0.414	147	0.015	2
Haiti	61.7	4.9	6.8	949	0.398	146	0.427	142	0.030	-4
Djibouti	56.1	3.8	4.7	2471	0.396	147	0.417	145	0.021	-2

Table 2 (Continued)

Country	Life expectancy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income (GNI) per capita (PPP \$)	HDI (new method)		HDI (old method)		Gap between the new and old HDI (old minus new)	
					value	rank	value	rank	value	rank
Tanzania (United Republic of)	56.9	5.1	5.3	1344	0.394	148	0.411	149	0.016	1
Côte d'Ivoire	58.4	3.3	6.3	1625	0.391	149	0.413	148	0.022	-1
Gambia	56.6	2.8	8.6	1358	0.391	150	0.407	150	0.016	0
Zambia	47.3	6.5	7.2	1359	0.390	151	0.393	154	0.003	3
Rwanda	51.1	3.3	10.6	1190	0.387	152	0.394	153	0.007	1
Malawi	54.6	4.3	8.9	911	0.380	153	0.397	152	0.017	-1
Sudan	58.9	2.9	4.4	2051	0.373	154	0.407	151	0.034	-3
Guinea	58.9	1.6	8.6	953	0.356	155	0.385	155	0.030	0
Afghanistan	44.6	3.3	8.0	1419	0.346	156	0.347	158	0.001	2
Ethiopia	56.1	1.5	8.3	992	0.344	157	0.369	157	0.025	0
Mali	49.2	1.4	8.0	1171	0.325	158	0.337	160	0.012	2
Sierra Leone	48.2	2.9	7.2	809	0.315	159	0.326	161	0.011	2
Burkina Faso	53.7	1.3	5.8	1215	0.315	160	0.344	159	0.029	-1
Central African Republic	47.7	3.5	6.3	758	0.310	161	0.321	163	0.011	2
Mozambique	48.4	1.2	8.2	854	0.304	162	0.316	165	0.012	3
Chad	49.2	1.5	6.0	1067	0.300	163	0.318	164	0.018	1
Liberia	59.1	3.9	11.0	320	0.299	164	0.379	156	0.081	-8
Guinea-Bissau	48.6	2.3	9.1	538	0.294	165	0.314	166	0.020	1
Burundi	51.4	2.7	9.6	402	0.284	166	0.323	162	0.039	-4
Niger	52.5	1.4	4.3	675	0.261	167	0.297	168	0.036	1
Congo (Democratic Republic of the)	48.0	3.8	7.8	291	0.236	168	0.288	169	0.052	1
Zimbabwe	47.0	7.2	9.2	176	0.137	169	0.313	167	0.176	-2

Notes:

1. The new and old HDI values are re-calculated based on database on the website of the Human Development Report. (<http://hdr.undp.org/en/>)
2. The new and old HDI ranks are determined using HDI values to the sixth decimal point.

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