

Human Development Index (HDI) in Time Distance Perspective 1980-2012

**The time dimension for HDI can be presented and
analysed in a new complementary way**

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HDI analysis needs a two-dimensional dynamic framework: static disparity and time distance perspective

- For development strategy and for policy considerations we need a **more realistic dynamic picture in both dimensions**
- **Time series of HDI are now available for selected years for the period 1980-2012** in the UNDP HDR 2013
- **From the same data** a broader dynamic view can be added if the **usual static statistical measures are complemented with** S-time-matrix format, S-time-distance and S-time-step measures to look into **intertemporal changes in composite indicators**
- **S-time-distance** as a time measure of the gap between compared units complements existing static measures of disparity
- **S-time-step** gives an alternative way to look at the dynamics of change (in addition to the growth rate) and provides an impression of the difficulty of increasing the value of the HDI in the past

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

Time matrix allows a quick level comparison to observe several stories:

- of the situation across countries in the group and between individual countries
- of how many steps over levels of indicators a given country has achieved

Time matrix for High human development group

HDI Level	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
Bahrain																					1981	1982	1984	1985	1987	1988	1990	1991	1993	1994	1995	1997	1998	2000	2002	2008
Bahamas																																				2010
Montenegro																																2005	2007	2008	2011	
Belarus																													2005	2006	2007	2007	2008	2009	2011	
Uruguay																						1982	1986	1989	1991	1994	1996	1998	2000	2005	2006	2006	2007	2009	2011	
Palau																																	2001	2010	2012	
Kuwait																									1983	1989	1991	1993	1994	1996	1997	1998	2000	2012		
Romania																											2000	2001	2002	2003	2004	2006	2007	2008		
Russian Federation																											2001	2002	2003	2005	2006	2007	2010			
Bulgaria																								1982	1985	1989	1994	1999	2001	2003	2004	2006	2008	2011		
Saudi Arabia														1981	1982	1983	1984	1986	1987	1988	1990	1991	1993	1994	1996	1997	1999	2000	2002	2004	2006	2008	2009	2011		
Cuba																			1981	1983	1984	1986	1988	1990	2000	2001	2002	2003	2004	2005	2006	2006	2007	2012		
Panama																					1982	1985	1988	1991	1992	1994	1996	1998	1999	2001	2004	2006	2007	2010	2012	
Mexico																1980	1982	1984	1986	1988	1989	1991	1992	1994	1995	1997	1998	2000	2002	2004	2006	2007	2010			
Libya																													2011	2011	2012	2012	2010			
Costa Rica																				1982	1985	1987	1989	1992	1994	1996	1999	2001	2003	2005	2006	2009	2010	2011		
Grenada																																			2012	
Serbia																													2001	2003	2005	2007				
Malaysia													1981	1982	1984	1985	1987	1988	1989	1991	1992	1993	1995	1996	1997	1998	2000	2001	2003	2005	2006	2009	2009			
Trinidad and Tobago																								1980	1992	1997	2000	2002	2003	2005	2007	2012				
Antigua and Barbuda																																			2012	
Kazakhstan																								2001	2001	2002	2003	2004	2005	2006	2009	2011				
Dominica																													2004	2008						
Albania																								1992	1995	1998	2000	2002	2004	2005	2008					
Venezuela (Bolivarian Republic of)																				1982	1992	1996	1999	2001	2003	2004	2006	2007	2007	2008	2009					
Saint Kitts and Nevis																													2006	2007	2009					
Lebanon																													2006	2007	2009					
Iran (Islamic Republic of)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1994	1995	1996	1997	1998	1999	2000	2001	2003	2004	2005	2006	2007	2009	2009	2010						
Georgia																													2006	2008	2011					
Peru													1980	1983	1985	1988	1990	1992	1994	1995	1997	1999	2000	2003	2005	2006	2008	2010	2012							
Ukraine																								2001	2002	2003	2004	2005	2009	2012						
The former Yugoslav Republic of Macedonia																													2007	2008	2012					
Bosnia and Herzegovina																																		2007		
Saint Vincent and the Grenadines																																		2009		
Mauritius													1981	1983	1984	1985	1987	1988	1989	1991	1993	1995	1997	1999	2001	2002	2004	2005	2007	2010						
Azerbaijan																																		2010		
Oman																												2008	2009	2012						
Jamaica																				1983	1986	1989	1992	1995	1998	2000	2003	2007	2007	2008	2012					
Brazil											1981	1983	1984	1986	1987	1989	1990	1991	1993	1994	1995	1996	1998	1999	2000	2002	2004	2005	2007	2009	2012					
Armenia																				1991	1996	2000	2001	2002	2003	2004	2005	2006	2009							
Saint Lucia																																	2009			
Ecuador											</																									

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

Time matrix can lead to two novel descriptive statistical measures

S-time-distance and S-time-step:

S-time-step (in years) is derived by subtracting horizontally the times in the time matrix finding for any given country the time needed to achieve next level of the selected indicator value

Time matrix for Medium human development group

HDI Level	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71																		
Tonga																																1991	1994	1997	2000	2004	2012																		
Belize																														1983	1986	1989	1994	1999	2002	2004	2010																		
Samoa																																	2001	2003	2006	2011																			
Fiji																								1982	1984	1987	1989	1991	1993	1995	1996	1998	1999	2000	2002	2004	2011																		
Dominican Republic																			1981	1983	1984	1986	1988	1989	1991	1993	1995	1996	1998	2000	2002	2003	2005	2007	2009	2011																			
Jordan																				1981	1983	1985	1987	1990	1991	1993	1995	1997	1998	2000	2001	2003	2004	2006	2012																				
China							1980	1981	1983	1984	1985	1986	1987	1988	1989	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010																				
Turkmenistan																																				2010																			
Thailand															1980	1981	1983	1984	1985	1986	1988	1989	1990	1992	1994	1996	1997	1999	2001	2002	2003	2005	2006	2009	2012																				
Maldives																											2001	2002	2003	2004	2005	2006	2007	2008	2010																				
Suriname																																		2006	2011																				
Gabon																				1980	1982	1983	1984	1985	1986	1988	1989	1990	1996	2001	2003	2004	2007	2009	2011																				
El Salvador															1982	1983	1985	1987	1989	1990	1991	1992	1993	1995	1996	1997	1998	1999	2000	2001	2003	2004	2006	2008	2012																				
Bolivia (Plurinational State of)																1980	1982	1983	1985	1986	1988	1989	1990	1992	1994	1995	1997	1998	2000	2002	2004	2006	2008	2011																					
Paraguay																					1980	1984	1987	1991	1993	1996	1998	2001	2003	2005	2007	2009	2011																						
Mongolia																							1992	2001	2001	2002	2003	2004	2005	2006	2007	2009	2010	2011																					
Palestine, State of																																			2012																				
Egypt					1980	1981	1982	1983	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1999	2000	2001	2003	2004	2006	2007	2009	2010																									
Moldova (Republic of)																											2001	2002	2003	2004	2006	2010	2012																						
Philippines																								1985	1990	1993	1997	2000	2003	2005	2008	2011																							
Uzbekistan																													2006	2007	2009	2011																							
Syrian Arab Republic																	1982	1983	1985	1987	1989	1991	1993	1996	1998	2001	2003	2006	2008	2009	2011																								
Micronesia (Federated States of)																																		2011																					
Botswana											1980	1981	1982	1982	1983	1984	1984	1985	1986	1987	1987	1988	1989	1990	2001	2004	2006	2007	2009																										
Guyana																		1991	1992	1994	1995	1996	1998	1999	2000	2002	2003	2005	2008	2011																									
Honduras												1981	1982	1984	1985	1987	1988	1990	1992	1995	1997	1999	2002	2004	2006	2007	2008	2008	2011																										
South Africa																								1980	1982	1984	1986	2007	2010																										
Kiribati																																		2010																					
Indonesia									1981	1983	1985	1987	1988	1990	1992	1993	1995	1997	1998	2000	2001	2003	2004	2006	2007	2008	2009	2010	2010																										
Vanuatu																																		2010																					
Kyrgyzstan																												2002	2005	2007	2011																								
Tajikistan																													2002	2005	2007	2010	2012																						
Viet Nam										1990	1991	1992	1993	1994	1995	1996	1997	1999	2000	2001	2002	2003	2005	2006	2007	2009	2010	2010																											
Namibia																													2002	2005	2007	2009																							
Nicaragua																					1985	1990	1992	1994	1996	1998	2000	2001	2002	2004	2005	2006	2009																						
Morocco					1981	1983	1984	1986	1987	1989	1990	1991	1993	1994	1996	1997	1998	2000	2001	2002	2003	2004	2005	2007	2009	2010	2012																												
Iraq																																		2008	2010	2012																			
Cape Verde																																		2002	2004	2006	2008	2010																	
Guatemala																																			2002	2007	2011																		
Timor-Leste																																			2000	2001	2003	2004	2005	2006	2007	2008	2009	2010	2011										
Equatorial Guinea																																			2000	2002	2004	2007	2008	2011															
India																																			1981	1982	1984	1985	1987	1988	1990	1992	1994	1996	1998	1999	2001	2002	2003	2004	2005	2007	2008	2009	2011
Ghana																																				1983	1985	1988	1991	1994	1997	2000	2002	2003	2005	2007	2007	2008	2009	2010	2011				
Cambodia																																				2001	2001	2002	2003	2004	2005	2006	2007	2010	2011										
Lao People's Democratic Republic																																				1990	1991	1993	1994	1996	1997	1998	2000	2001	2002	2003	2005	2006	2007	2008	2010	2011			
Swaziland																																											2006	2007	2010										
Bhutan																																													2011										

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

Time matrix can lead to two novel descriptive statistical measures

S-time-distance and S-time-step:

S-time-distance (in years) is derived by subtracting vertically the times in the time matrix showing for selected levels the time lead (-) or time lag (+) from the benchmark unit

(see slide S-time-distance in years as a time measure of the gap)

Time matrix for Low human development group

HDI Level	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53
Congo																														1980	1983	2002	2004	2007	2008	2011
Solomon Islands																																2001	2003	2005	2010	2012
Sao Tome and Principe																																2005	2007	2008	2010	
Pakistan																	1981	1983	1985	1987	1989	1992	1995	1998	2000	2001	2002	2002	2003	2004	2005	2006	2008	2010		
Kenya																											1982	1984	2001	2003	2005	2006	2007	2009	2010	
Bangladesh																	1982	1984	1986	1988	1990	1991	1993	1994	1995	1997	1998	2000	2001	2002	2003	2005	2006	2007	2009	2011
Angola																						2001	2002	2004	2005	2006	2006	2006	2007	2007	2007	2008	2009	2010		
Myanmar												1984	1988	1991	1992	1993	1995	1996	1997	1998														2008	2009	2010
Cameroon																						1981	1983	1985	1986	1988	2000	2002	2004	2007	2008	2009	2011			
Madagascar																											2000	2002	2003	2004	2006	2007				
Lesotho																												2007	2008	2010	2012	1991				
Tanzania (United Republic of)																			1994	2000	2002	2004	2006	2007	2008	2008	2009	2009	2009	2009	2011					
Nigeria																												2006	2007	2010	2012					
Senegal																	1982	1984	1986	1988	1991	1993	1996	1999	2001	2002	2003	2005	2007	2008	2012					
Mauritania																		1980	1986	1990	1992	1994	1995	1997	1999	2000	2003	2005	2006	2009						
Papua New Guinea																	1981	1984	1986	1988	1990	1993	1995	1997	1999	2002	2005	2007	2008	2011						
Yemen												1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2011							
Nepal							1981	1982	1982	1983	1984	1985	1986	1987	1988	1989	1990	1992	1993	1995	1997	1998	2000	2002	2003	2005	2007	2009	2011							
Togo																				1981	1985	1989	1992	1994	1996	1999	2002	2006	2010							
Haiti																	1981	1982	1984	1985	1987	1989	1990	1995	1999	2003	2006	2010								
Uganda												1991	1992	1993	1995	1996	1998	1999	2001	2002	2004	2005	2006	2007	2008	2010										
Zambia																						2001	2003	2005	2007	2008	2009	2010								
Djibouti																												2006	2007	2010	2011					
Gambia											1980	1983	1985	1987	1989	1992	1995	1997	2000	2003	2006	2007	2007	2008	2008	2009	2011									
Benin									1981	1983	1984	1986	1988	1989	1991	1992	1994	1995	1997	1998	2000	2001	2003	2004	2007	2009										
Rwanda								1991	1992	1993	1995	1996	1997	1998	2000	2000	2001	2002	2003	2004	2004	2005	2006	2007	2008	2009	2011									
Côte d'Ivoire																				1982	1990	1993	1996	1999	2003	2007	2009	2012								
Zimbabwe																				2008	2009	2010	2010	2011	1995	1993	1991									
Comoros																												2005								
Sudan									1980	1983	1987	1990	1991	1993	1995	1996	1998	1999	2001	2003	2005	2007	2010													
Malawi																	1983	1988	1991	1993	1994	1996	1998	2000	2004	2006	2007	2008	2009	2010						
Ethiopia																	2001	2002	2003	2004	2005	2006	2006	2007	2008	2008	2009	2011								
Liberia														1987	2006	2006	2007	2008	2008	2009	2010	2011														
Afghanistan					1980	1983	1986	2000	2001	2001	2002	2003	2003	2004	2004	2005	2005	2006	2008	2009	2011															
Guinea-Bissau																						2006	2010													
Guinea																											2007	2010								
Burundi					1981	1982	1984	1986	1988	2000	2002	2004	2005	2006	2007	2008	2009	2011																		
Sierra Leone										2000	2001	2002	2003	2003	2004	2005	2006	2007	2009	2011																
Central African Republic																						1982	2002	2006	2007	2008	2009	2012								
Eritrea																																				2012
Mali	1981	1985	1989	1991	1992	1994	1995	1997	1998	2000	2001	2002	2004	2005	2006	2008	2009																			
Burkina Faso																												2006	2008	2009	2011					
Chad																						2000	2002	2004	2008	2009	2012									
Mozambique					1992	1994	1996	1998	2000	2002	2003	2004	2006	2007	2009	2011																				
Congo (Democratic Republic of the)																																				
Niger	1981	1986	1991	1993	1996	1999	2001	2002	2004	2005	2007	2009	2011																							

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

S-time-distance in years as a time measure of the gap

(-) time lead, (+) time lag for the example of Very high human development countries from the group average for a given level of the HDI

HDI Level	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
Very high Human Development	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway				-7	-7	-7	-7	-7	-7	-8	-9	-10	-13
Australia									-17	-15	-13	-12	-14
United States								-15	-14	-13	-12	-11	-12
Netherlands			-6	-6	-6	-5	-5	-5	-5	-5	-5	-6	-4
Germany	5	4	3	3	2	1	1	0	0	-1	-1	-2	-5
Ireland	6	6	5	4	3	2	1	0	-1	-2	-3	-3	-6
New Zealand				-7	-6	-4	-4	-4	-4	-4	-4	-5	-6
Sweden			-4	-3	-2	-2	-2	-3	-4	-5	-6	-7	-10
Switzerland					-10	-7	-5	-4	-4	-4	-3	-3	-2
Canada						-11	-11	-10	-10	-8	-6	-5	-6
Japan		-3	-4	-4	-4	-4	-4	-3	-3	-3	-2	-2	-4
Iceland	1	1	1	1	0	0	0	0	-1	-1	-1	-2	-1
Korea (Republic of)	12	11	10	8	7	6	6	5	4	4	3	2	0
Hong Kong, China (SAR)	7	7	8	10	10	9	8	8	7	6	4	3	1
Denmark		-4	-2	-1	0	0	0	0	0	0	-1	-1	1
Israel	0	1	1	2	1	1	1	1	1	1	1	1	3
Belgium	1	1	1	0	0	-1	-1	-2	-2	-3	-4	1	
Slovenia								5	4	3	3	4	
Austria	5	5	4	4	4	4	4	4	5	5	4	4	
France	8	7	6	5	5	4	4	3	3	3	3	4	
Singapore	12	11	10	9	9	8	8	8	8	7	6	5	
Finland	2	3	4	4	4	4	4	4	3	3	2	5	
Spain	11	10	9	8	6	6	5	4	5	5	6		
Italy	10	9	9	8	7	7	6	6	5	5	7		
Liechtenstein											7		
United Kingdom	7	7	7	6	6	5	5	5	5	7			
Luxembourg	6	5	4	4	3	3	2	2	1	8			
Czech Republic						8	8	7	6	8			
Greece	11	11	11	12	10	9	8	7	13				
Brunei Darussalam	7	8	8	7	7	7	8	9					
Cyprus	9	10	11	13	15	15	14						
Malta	14	14	14	13	13	15	15						
Andorra							15						
Estonia	17	17	15	14	13	12	16						
Slovakia	17	17	16	16	15	14	17						
United Arab Emirates					18	14							
Qatar	15	14	14	13	13	18							
Hungary	17	16	16	15	14	18							
Barbados	15	16	20	20	18								
Poland	19	19	19	19	21								
Portugal	18	19	20	19									
Chile	22	22	21	21									
Lithuania	21	20	19	22									
Argentina	24	24	23	23									
Latvia	22	21	20	23									
Croatia	22	22	23										
Seychelles	23	23	24										

S-time-distance: (-) time lead, (+) time lag from the average for Very high human development

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

S-time-distance in years as a time measure of the gap

(-) time lead, (+) time lag for the example of High human development countries from the group average for a given level of the HDI

HDI Level	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75
High Human Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bahrain					-8	-9	-10	-11	-12	-13	-13	-13	-13	-13	-14
Bahamas															
Montenegro															
Belarus													-1	-2	-3
Uruguay							-12	-11	-10	-9	-9	-9	-8	-8	-4
Palau															
Kuwait										-18	-14	-13	-13	-13	-14
Romania											-2	-3	-3	-4	-5
Russian Federation												-3	-4	-4	-5
Bulgaria								-14	-13	-12	-9	-5	-4	-5	-5
Saudi Arabia	4	3	2	1	1	0	-1	-2	-3	-3	-4	-4	-4	-4	-4
Cuba			-4	-4	-4	-5	-6	-6	1	0	0	-1	-1	-2	-4
Panama				-5	-4	-3	-3	-4	-5	-5	-5	-5	-4	-4	-4
Mexico	1	1	1	1	0	0	-1	-2	-4	-4	-4	-5	-4	-3	-4
Libya													5	4	2
Costa Rica			-3	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	0
Grenada															
Serbia													-5	-4	-5
Malaysia	6	5	4	4	3	2	1	0	-2	-2	-3	-3	-3	-3	-3
Trinidad and Tobago								-16	-6	-4	-2	-2	-2	-2	-3
Antigua and Barbuda															
Kazakhstan						7	5	4	2	2	1	1	2	2	
Dominica													-2	0	
Albania						-1	-1	-1	-1	-1	-1	-1	0	0	
Venezuela (Bolivarian Republic of)			-3	5	7	8	8	7	6	5	4	3	2	1	
Saint Kitts and Nevis														2	
Lebanon												2	2	2	
Iran (Islamic Republic of)	15	14	13	12	11	10	9	8	7	5	5	4	4	3	
Georgia												2	2	4	
Peru	7	7	7	7	6	6	5	4	4	4	4	4	4	4	
Ukraine							5	3	2	2	2	1	4	5	
The former Yugoslav Republic of Macedonia												3	2	5	
Bosnia and Herzegovina													1		
Saint Vincent and the Grenadines													3		
Mauritius	7	6	6	6	6	6	5	4	3	3	3	3	4		
Azerbaijan													4		
Oman											6	4	6		
Jamaica		0	1	2	3	4	4	4	5	6	5	3	6		
Brazil	12	11	10	9	9	8	7	6	5	4	5	5	6		
Armenia			6	9	11	10	9	7	6	5	4	5			
Saint Lucia												5			
Ecuador	3	3	4	5	7	9	9	8	8	7	5	6			
Turkey	14	14	13	12	12	11	10	8	7	6	7	7			
Colombia	11	11	10	10	10	9	9	9	7	7	7				
Algeria	17	16	16	15	13	12	11	9	8	8	8				
Sri Lanka	9	10	10	10	11	10	9	8	8	8	8				
Tunisia	15	15	14	13	12	11	10	9	8	7	9				

S-time-distance: (-) time lead, (+) time lag from the average for High human development

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

S-time-distance in years as a time measure of the gap

(-) time lead, (+) time lag for the example of Medium human development countries from the group average for a given level of the HDI

HDI Level	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64
Medium Human Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonga																							
Belize																						-27	-26
Samoa																							
Fiji																	-22	-21	-19	-18	-17	-17	-17
Dominican Republic												-16	-16	-16	-15	-15	-15	-14	-13	-13	-12	-12	-12
Jordan															-19	-18	-17	-16	-16	-15	-14	-14	-13
China	1	1	0	0	-1	-1	-2	-2	-2	-3	-3	-4	-4	-4	-5	-5	-5	-5	-5	-5	-5	-6	-7
Turkmenistan																							
Thailand																							
Maldives																							
Suriname																							
Gabon																							
El Salvador																							
Bolivia (Plurinational State of)																							
Paraguay																							
Mongolia																							
Palestine, State of																							
Egypt	1	1	0	0	-1	-2	-2	-3	-3	-3	-4	-4	-5	-5	-5	-5	-5	-5	-5	-4	-4	-4	-5
Moldova (Republic of)																							
Philippines																							
Uzbekistan																							
Syrian Arab Republic																							
Micronesia (Federated States of)																							
Botswana																							
Guyana																							
Honduras																							
South Africa																							
Kiribati																							
Indonesia																							
Vanuatu																							
Kyrgyzstan																							
Tajikistan																							
Viet Nam																							
Namibia																							
Nicaragua																							
Morocco																							
Iraq																							
Cape Verde																							
Guatemala																							
Timor-Leste																							
Equatorial Guinea																							
India																							
Ghana																							
Cambodia																							
Lao People's Democratic Republic																							
Swaziland																							
Bhutan																							

S-time-distance: (-) time lead, (+) time lag from the average for Medium human development

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

S-time-distance in years as a time measure of the gap

(-) time lead, (+) time lag for the example of Low human development countries from the group average for a given level of the HDI

HDI Level	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46
Low Human Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congo															
Solomon Islands															
Sao Tome and Principe															
Pakistan			-6	-7	-8	-9	-9	-9	-7	-6	-4	-5	-5	-6	-7
Kenya												-24	-23	-8	-7
Bangladesh	0	-1	-1	-2	-3	-4	-6	-7	-7	-6	-6	-6	-6	-6	-6
Angola							2	2	2	2	2	1	0	-2	-3
Myanmar	11	9	7	6	4	3	1	0	0	-1	-1	-1	-1	-2	-3
Cameroon							-17	-18	-17	-17	-16	-6	-5	-4	-3
Madagascar												-5	-5	-5	-6
Lesotho												1	1	1	2
Tanzania (United Republic of)					2	4	4	3	4	4	4	3	2	1	-1
Nigeria													-1	-1	0
Senegal		-3	-3	-4	-5	-5	-5	-5	-3	-3	-2	-2	-2	-2	-2
Mauritania			-7	-4	-2	-4	-5	-5	-5	-5	-4	-3	-2	-2	-1
Papua New Guinea		-3	-4	-4	-5	-5	-6	-6	-5	-4	-3	-1	0	0	1
Yemen	12	11	9	7	5	4	2	1	0	0	0	-1	0	0	1
Nepal	7	5	3	2	0	-1	-2	-2	-2	-2	-1	-1	0	0	1
Togo					-12	-11	-9	-9	-8	-7	-6	-4	-1	1	
Haiti			-6	-8	-9	-10	-12	-12	-11	-8	-5	-3	-1	2	
Uganda	11	9	8	6	5	4	2	2	2	2	2	2	2	2	
Zambia							2	2	3	4	4	3	4		
Djibouti										3	3	4	4		
Gambia	8	8	7	7	7	8	8	7	5	4	3	3	4		
Benin	9	8	7	5	4	3	1	1	1	1	3	4			
Rwanda	19	17	15	13	11	9	7	5	5	5	5	5			
Côte d'Ivoire				-8	-3	-3	-2	-1	1	3	4	6			
Zimbabwe				18	16	14	12	11	-7	-10	-13				
Comoros											1				
Sudan	12	10	9	8	7	5	5	4	5	6					
Malawi	13	12	11	10	11	10	8	7	7						
Ethiopia	24	22	19	17	15	13	11	10							
Liberia	25	23	20	18	16	15	12								
Afghanistan	23	21	19	18	16	15									
Guinea-Bissau				16	17										
Guinea				20	20										
Burundi	25	24	22	21											
Sierra Leone	24	23	22	21											
Central African Republic	26	24	22	22											
Eritrea				22											
Mali	25	23	22												
Burkina Faso	26	25	24												
Chad	26	25	25												
Mozambique	29														
Congo (Democratic Republic of the)															
Niger															

S-time-distance: (-) time lead, (+) time lag from the average for Low human development

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

The four slides present estimates of S-time-step for all 187 countries

S-time-step: how many years were needed to reach the next level of HDI

S-time-step gives an alternative way to look at the dynamics of change

Very high human development

HDI Level	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	
Norway																			2.1	2.1	2.1	2.1	1.6	1.4	1.4	1.4	1.4	1.4	1.4	1.8	1.9	5.5	
Australia																								4.4	4.3	2.9	2.9	2.9	3.5	4.2			
United States																							2.9	2.9	3.0	3.5	3.4	3.4	3.1	4.9			
Netherlands																		2.3	2.3	2.3	2.3	2.1	2.0	2.0	2.0	2.0	5.4	1.7	3.7				
Germany											1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	3.4	3.8				
Ireland												2.1	2.1	2.1	2.1	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.8	1.8	1.8					
New Zealand																			3.6	3.6	2.8	1.9	1.9	1.9	1.9	1.9	2.1	2.4	3.2				
Sweden																		3.2	3.2	1.9	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	9.9				
Switzerland																			4.5	4.5	2.4	2.4	2.4	2.4	2.4	3.0	5.5	1.7					
Canada																				2.5	2.5	2.5	3.5	4.5	4.0	2.6	7.6						
Japan																		2.0	2.0	2.0	2.0	2.2	2.4	2.4	2.4	2.5	2.8	2.7	5.0				
Iceland																		2.2	2.2	2.2	2.2	2.0	1.8	1.8	1.8	1.8	1.7	1.7	5.8				
Korea (Republic of)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.4	1.4	1.4	1.4	1.3	2.3					
Hong Kong, China (SAR)											1.3	1.3	1.3	1.3	1.3	1.3	1.8	3.7	3.7	2.4	1.2	1.2	1.2	1.2	1.0	0.8	0.7	2.1					
Denmark																			3.8	3.8	3.1	1.9	1.9	1.9	1.9	1.9	2.1	2.1	6.1				
Israel																			2.8	2.8	2.7	1.8	1.8	1.8	1.8	2.1	2.5	2.8	5.4				
Belgium																		1.9	1.9	1.9	1.9	1.8	1.5	1.5	1.5	1.5	1.5	7.3					
Slovenia																								1.5	1.5	1.6	3.7						
Austria													2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6	2.3	1.7	2.3						
France												1.8	1.8	1.8	1.8	1.6	1.5	1.5	1.5	1.5	1.4	1.5	1.9	2.1	2.2	3.9							
Singapore																		1.4	1.4	1.4	1.4	1.4	1.6	1.9	1.9	1.7	1.6	1.3	0.7				
Finland																		2.9	2.9	2.9	2.3	2.3	2.3	2.3	1.8	1.3	1.4	1.3	5.3				
Spain											1.7	1.7	1.7	1.7	1.7	1.5	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.6	2.8	2.4	3.0					
Italy											2.1	2.1	2.1	2.1	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.4	1.5	4.5							
Liechtenstein																																	
United Kingdom													2.8	2.8	2.8	2.2	1.8	1.8	1.8	1.8	1.8	1.8	2.1	2.1	4.0								
Luxembourg												1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	9.2								
Czech Republic																								1.3	1.3	1.3	4.3						
Greece											2.2	2.2	2.2	2.2	2.5	2.6	2.6	2.6	1.0	1.0	1.0	1.0	1.0	8.2									
Brunei Darussalam																		5.9	2.9	2.1	2.1	2.1	2.1	2.8	2.6								
Cyprus											1.6	1.6	1.6	1.6	1.6	1.8	3.5	3.5	3.9	4.5	1.8	1.1											
Malta											2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.0	1.9	3.5	2.3											
Andorra																																	
Estonia											1.7	1.7	1.7	1.7	1.7	1.5	1.1	1.1	1.1	1.1	1.1	5.2											
Slovakia																		3.2	3.2	2.5	1.7	1.7	1.5	1.1	5.0								
United Arab Emirates																																	
Qatar																																	
Hungary																																	
Barbados																																	
Poland																																	
Portugal																																	
Chile																																	
Lithuania																																	
Argentina																																	
Latvia																																	
Croatia																																	
Seychelles																																	

Source: Own calculations based on data from Human Development Report 2013, UNDP, Statistical Annex, Table 2, p. 148-151

S-time-step: how many years were needed to reach the next level of HDI

S-time-step gives an alternative way to look at the dynamics of change

Medium human development

HDI Level	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71
Tonga																																	3.0	3.0	3.1	3.3	8.3
Belize																														3.1	3.1	4.6	5.3	2.9	2.3	5.9	
Samoa																																	1.9	2.7	4.5		
Fiji																										2.4	2.4	2.4	2.0	1.8	1.8	1.8	1.8	1.8	2.2	2.2	6.7
Dominican Republic																			1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.4	2.1	2.3	
Jordan																					2.1	2.1	2.1	2.1	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.5	1.5	1.5	1.6	6.0	
China								1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.0	1.0	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.0	0.8	0.8	1.0	1.2	1.2		
Turkmenistan																																					
Thailand																1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.6	1.3	1.4	1.3	1.5	2.9	2.9	
Maldives																												1.1	1.1	1.1	1.0	0.7	0.9	0.9	1.9		
Suriname																																			4.2		
Gabon																				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.9	4.7	1.9	1.9	2.3	2.0	2.5			
El Salvador																1.8	1.8	1.8	1.8	1.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.4	1.4	1.4	1.5	2.2	4.0		
Bolivia (Plurinational State of)																1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.8	1.9	1.8	2.8	2.4			
Paraguay																						3.5	3.5	3.3	2.6	2.6	2.6	2.4	2.1	2.1	2.2	2.3	1.7				
Mongolia																							8.5	0.9	0.9	0.9	0.9	0.9	1.0	1.5	1.3	1.6	1.0				
Palestine, State of																																					
Egypt								1.0	1.1	1.0	1.1	1.0	1.1	1.0	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.4	1.6	1.6	1.4	1.4	1.5	1.4				
Moldova (Republic of)																													1.1	1.1	1.1	1.4	4.0	2.3			
Philippines																									5.0	3.6	3.5	3.5	2.5	2.5	2.7	2.8					
Uzbekistan																																1.3	2.2	2.0			
Syrian Arab Republic																			1.8	1.8	1.8	1.8	2.0	2.6	2.6	2.6	2.5	2.3	2.8	2.3	0.5						
Micronesia (Federated States of)																																					
Botswana													0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	11.3	2.9	2.0	1.3	2.1							
Guyana																			1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.6	1.6	1.6	3.0	2.5							
Honduras														1.6	1.6	1.6	1.6	1.6	1.6	2.3	2.3	2.3	2.3	2.5	2.6	2.0	0.8	0.3	0.3	3.1							
South Africa																									2.0	2.0	2.0	21.4	2.5								
Kiribati																																					
Indonesia										1.8	1.8	1.8	1.8	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.4	1.4	1.4	1.4	0.9	1.2	1.1	1.1								
Vanuatu																																					
Kyrgyzstan																												2.6	1.9	4.2							
Tajikistan																													1.0	0.9	0.9	0.9	2.7	0.6	0.5	1.8	2.0
Viet Nam																																					
Namibia																																					
Nicaragua																																					
Morocco																																					
Iraq																																					
Cape Verde																																					
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Bhutan																																					

S-time-step: how many years were needed to reach the next level of HDI

S-time-step gives an alternative way to look at the dynamics of change

Low human development

HDI Level	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	
Congo																																2.5	19.2	2.1	2.8	1.8	2.2
Solomon Islands																																		2.1	2.1	4.7	2.3
Sao Tome and Principe																																		1.3	1.3	2.0	
Pakistan																		2.2	2.2	2.2	2.2	2.6	2.8	2.8	2.6	0.8	0.8	0.8	0.8	0.8	0.8	1.6	1.3	2.0			
Kenya																											2.6	16.5	2.0	2.0	1.4	0.9	1.6	1.3			
Bangladesh																2.0	2.0	2.0	2.0	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.4	1.4	2.0			
Angola																					1.6	1.6	1.4	0.6	0.2	0.2	0.2	0.2	0.2	0.2	1.5	0.9	0.6				
Myanmar													4.2	2.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.0	1.0	0.9	0.9	1.0	1.0	0.8	0.5	1.0	1.1	1.1					
Cameroon																					1.7	1.7	1.7	1.7	12.1	2.1	2.1	2.7	0.7	1.0	1.8						
Madagascar																											1.3	1.3	1.3	1.5	1.7						
Lesotho																											1.4	1.6	2.3	-20.9							
Tanzania (United Republic of)																					5.8	1.9	1.9	1.8	1.5	0.8	0.2	0.2	0.2	0.4	1.8						
Nigeria																													1.8	2.2	2.2						
Senegal																	2.2	2.2	2.2	2.3	2.7	2.7	2.7	2.0	1.4	1.4	1.4	1.7	1.3	4.1							
Mauritania																		5.9	4.6	1.6	1.6	1.6	1.6	1.6	1.7	2.2	2.2	1.2	2.9								
Papua New Guinea																	2.3	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.8	3.4	1.6	1.6	2.1								
Yemen													1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.6	2.9							
Nepal								0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.6	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.5	2.5								
Togo																					4.0	4.0	2.6	2.3	2.3	2.3	3.4	3.6	3.9								
Haiti																		1.6	1.6	1.6	1.6	1.6	1.8	4.3	4.4	3.5	3.2	4.1									
Uganda																1.5	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.4	1.1	1.0	1.1	1.6									
Zambia																											2.2	2.1	1.7	1.2	0.9	1.5					
Djibouti																											1.5	2.2	1.3								
Gambia																																					
Benin																																					
Rwanda																																					
Côte d'Ivoire																																					
Zimbabwe																																					
Comoros																																					
Sudan																																					
Malawi																																					
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Niger																																					

For methodology see

P. Sicherl, New Understanding and Insights from Time-Series Data Based on Two Generic Measures: S-time-distance and S-time-step; Working paper No. 44, Statistics Directorate, OECD Publishing, Paris, November 2011

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