

# Supplement: Probability of death before age 70: progress as years behind or ahead of the global average trend

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**Table S1: Regions and availability of GDP data in parentheses\***

Central & East- ern Europe	Central Asia	Latin America & the Caribbean	Middle East & North Africa	North Atlantic	Sub-Saharan Africa	Western Pac- ific & Asia
Albania	Afghanistan	Anguilla (No GDP)	Algeria	Andorra (No GDP)	Angola	American Samoa (No GDP)
Armenia	Azerbaijan	Antigua & Barbuda (No GDP)	Bahrain	Austria	Benin	Australia
Belarus	Kazakhstan	Argentina	Egypt, Arab Rep.	Belgium	Botswana	Bangladesh
Bosnia & Herzegovina	Kyrgyz Republic	Aruba (No GDP)	Iran, Islamic Rep.	Bermuda (No GDP)	Burkina Faso	Bhutan (No GDP)
Bulgaria	Mongolia	Bahamas, The (No GDP)	Iraq	Canada	Burundi	Brunei Darussalam (No GDP)
Croatia	Pakistan	Barbados	Israel	Cyprus	Cabo Verde	Cambodia
Czechia	Tajikistan	Belize (No GDP)	Jordan	Denmark	Cameroon	Cook Islands (No GDP)
Estonia	Turkmenistan	Bolivia	Kuwait	Faroe Islands (No GDP)	Central African Republic	Fiji (No GDP)
Georgia	Uzbekistan	Bonaire, Sint Eustatius & Saba (No GDP)	Lebanon	Finland	Chad	French Polynesia (No GDP)
Hungary		Brazil	Libya	France	Comoros	Guam (No GDP)
Kosovo (No GDP)		British Virgin Islands (No GDP)	Morocco	Germany	Congo, Dem. Rep.	Hong Kong SAR, China
Latvia		Cayman Islands (No GDP)	Oman	Gibraltar (No GDP)	Congo, Rep.	Indonesia
Lithuania		Chile	Qatar	Greece	Côte d'Ivoire	Japan
Moldova		Colombia	Saudi Arabia	Greenland (No GDP)	Djibouti	Kiribati (No GDP)
Montenegro		Costa Rica	Syria	Guernsey (No GDP)	Equatorial Guinea	Korea, Dem. People's Rep.
North Macedonia		Cuba	Tunisia	Iceland	Eritrea (No GDP)	Korea, Rep.
Poland		Curaçao (No GDP)	Türkiye	Ireland	Eswatini	Lao PDR
Romania		Dominica	United Arab Emirates	Isle of Man (No GDP)	Ethiopia	Macao SAR, China (No GDP)
Russia		Dominican Republic	West Bank & Gaza	Italy	Gabon	Malaysia
Serbia		Ecuador	Yemen, Rep.	Jersey (No GDP)	Gambia, The	Maldives (No GDP)
Slovak Republic		El Salvador		Liechtenstein (No GDP)	Ghana	Marshall Islands (No GDP)
Slovenia		Falkland Islands (No GDP)		Luxembourg	Guinea	Micronesia, Fed. Sts. (No GDP)
Ukraine		French Guiana (No GDP)		Malta	Guinea-Bissau	Myanmar
		Grenada (No GDP)		Monaco (No GDP)	Kenya	Nauru (No GDP)
		Guadeloupe (No GDP)		Netherlands	Lesotho	Nepal
		Guatemala		Norway	Liberia	New Caledonia (No GDP)

Central & East- ern Europe	Central Asia	Latin America & the Caribbean	Middle East & North Africa	North Atlantic	Sub-Saharan Africa	Western Pac- ific & Asia
		Guyana (No GDP) Haiti		Portugal Saint Pierre & Miquelon (No GDP)	Madagascar Malawi	New Zealand Niue (No GDP)
		Honduras		San Marino (No GDP)	Mali	Northern Mariana Islands (No GDP)
		Jamaica Martinique (No GDP)		Spain Sweden	Mauritania Mauritius	Palau (No GDP) Papua New Guinea (No GDP)
		Mexico Montserrat (No GDP) Nicaragua Panama Paraguay Peru Puerto Rico Saint Barthelemy (No GDP)		Switzerland United Kingdom	Mayotte (No GDP) Mozambique Namibia Niger Nigeria Reunion (No GDP) Rwanda Saint Helena (No GDP) Senegal	Philippines Samoa (No GDP) Singapore Solomon Islands (No GDP) Sri Lanka Taiwan, China Thailand Timor-Leste (No GDP)
		Sint Maarten (Dutch part) (No GDP) St. Kitts & Nevis (No GDP) St. Lucia St. Martin (French part) (No GDP) St. Vincent & the Grenadines (No GDP) Suriname (No GDP)			Seychelles Sierra Leone Somalia (No GDP)	Tokelau (No GDP)  Tonga (No GDP) Tuvalu (No GDP) Vanuatu (No GDP)
		Trinidad & Tobago Turks & Caicos Islands (No GDP) Uruguay Venezuela, RB Virgin Islands (U.S.) (No GDP)			South Africa	Vietnam
					South Sudan (No GDP) Sudan São Tomé & Príncipe	Wallis & Futuna (No GDP)
					Tanzania Togo Uganda Western Sahara (No GDP) Zambia	

Central & East- ern Europe	Central Asia	Latin America & the Caribbean	Middle East & North Africa	North Atlantic	Sub-Saharan Africa	Western Pac- ific & Asia
					Zimbabwe	

Notes: \*Countries without a year range in parentheses have complete GDP data 1950–2019. India, China, and the United States were considered separately and had complete GDP data.

**Table S2. PPD and GDP in 2000 and 2019**

	PPD 2000	GDP 2000	PPD 2019	GDP 2019
Central & Eastern Europe	43.63	9,168	31.50	21,282
Central Asia	48.84	2,958	39.87	5,856
China	30.75	4,730	21.01	16,880
India	48.57	2,753	36.92	7,294
Latin America & Caribbean	35.20	9,380	27.35	13,042
Middle East & North Africa	36.98	8,299	26.87	14,665
North Atlantic	20.56	32,588	14.91	40,716
Sub-Saharan Africa	64.99	1,523	51.65	2,672
United States	25.13	45,886	22.11	56,469
Western Pacific & Southeast Asia	37.92	5,868	30.15	11,387
World	40.17	5,625	31.91	10,954

Notes: Probability of premature death (PPD) was defined as dying before age 70 years. GDP was per capita in 2011\$.

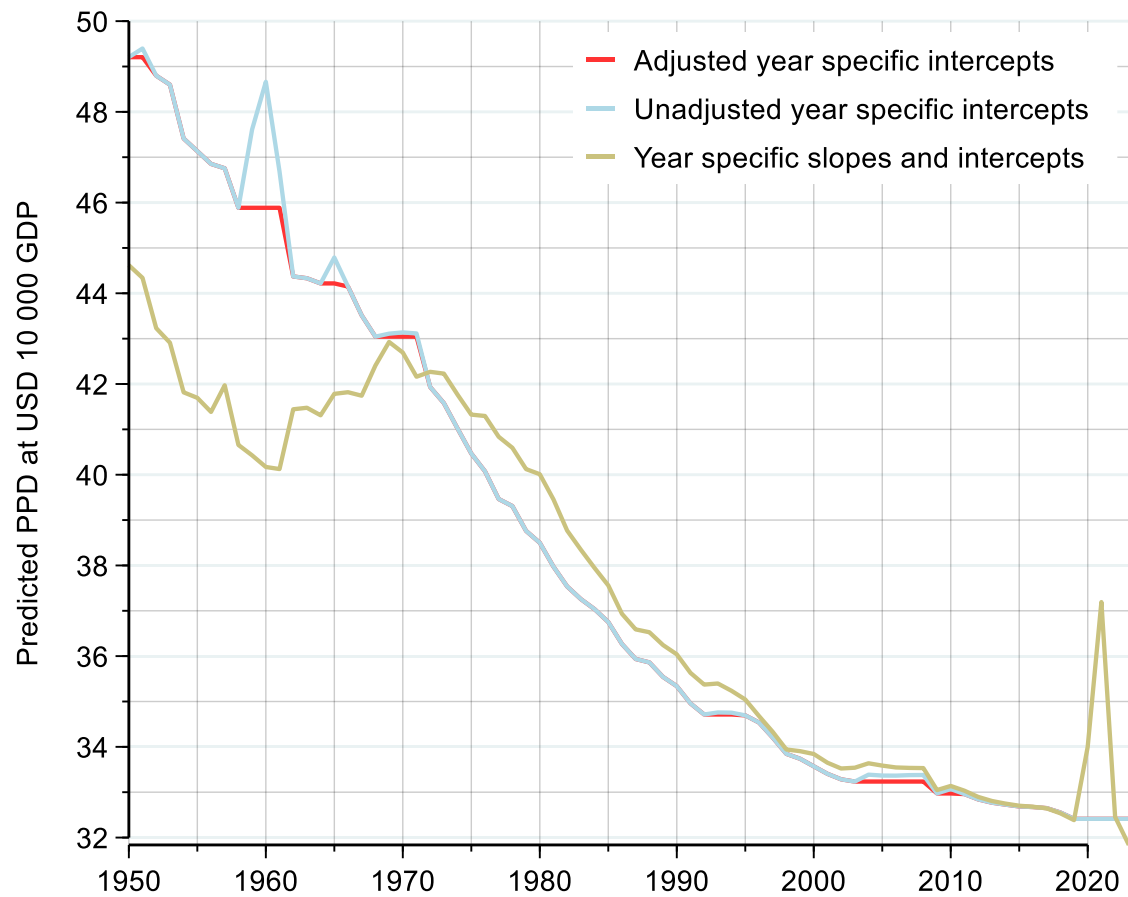
**Table S3. Results from linear regressions of PPD on log of real GDP per capita**

Year	Main model		Sensitivity check	
	Intercept	Coefficient	Intercept	Coefficient
1950	148.013	-10.728	169.436	-13.552
1951	148.204 (148.013)	-10.728	173.061	-13.976
1952	147.605	-10.728	175.859	-14.400
1953	147.407	-10.728	177.395	-14.601
1954	146.220	-10.728	175.590	-14.524
1955	145.941	-10.728	175.269	-14.503
1956	145.660	-10.728	175.912	-14.606
1957	145.563	-10.728	172.269	-14.147
1958	144.692	-10.728	173.964	-14.474
1959	146.419 (144.692)	-10.728	186.977	-15.911
1960	147.470 (144.692)	-10.728	196.097	-16.929
1961	145.492 (144.692)	-10.728	182.395	-15.447
1962	143.178	-10.728	160.075	-12.880
1963	143.139	-10.728	160.220	-12.892
1964	143.025	-10.728	161.185	-13.015
1965	143.595 (143.025)	-10.728	162.747	-13.133
1966	142.956	-10.728	157.983	-12.612
1967	142.320	-10.728	153.808	-12.167
1968	141.851	-10.728	146.014	-11.249
1969	141.917 (141.851)	-10.728	143.164	-10.883
1970	141.945 (141.851)	-10.728	145.111	-11.120
1971	141.922 (141.851)	-10.728	148.840	-11.583
1972	140.741	-10.728	138.294	-10.426
1973	140.386	-10.728	135.448	-10.121
1974	139.824	-10.728	134.117	-10.027
1975	139.275	-10.728	132.609	-9.911
1976	138.881	-10.728	129.321	-9.557
1977	138.271	-10.728	127.191	-9.376
1978	138.116	-10.728	127.328	-9.417
1979	137.568	-10.728	126.008	-9.325
1980	137.306	-10.728	124.203	-9.141
1981	136.780	-10.728	123.852	-9.163
1982	136.344	-10.728	125.440	-9.410
1983	136.064	-10.728	126.247	-9.544
1984	135.842	-10.728	127.381	-9.711
1985	135.559	-10.728	127.839	-9.802
1986	135.075	-10.728	128.572	-9.950
1987	134.744	-10.728	128.185	-9.945
1988	134.670	-10.728	127.764	-9.906
1989	134.348	-10.728	126.949	-9.848
1990	134.146	-10.728	126.779	-9.852
1991	133.765	-10.728	126.710	-9.889
1992	133.521	-10.728	126.517	-9.896
1993	133.565 (133.521)	-10.728	126.593	-9.901
1994	133.560 (133.521)	-10.728	128.146	-10.088
1995	133.501	-10.728	129.380	-10.242
1996	133.344	-10.728	131.557	-10.518
1997	133.013	-10.728	131.380	-10.537
1998	132.653	-10.728	131.414	-10.583
1999	132.544	-10.728	130.309	-10.467
2000	132.378	-10.728	128.547	-10.282
2001	132.213	-10.728	128.590	-10.308
2002	132.091	-10.728	128.339	-10.295

Year	Main model		Sensitivity check	
	Intercept	Coefficient	Intercept	Coefficient
2003	132.042	-10.728	126.867	-10.133
2004	132.193 (132.042)	-10.728	127.425	-10.183
2005	132.174 (132.042)	-10.728	127.459	-10.192
2006	132.172 (132.042)	-10.728	127.673	-10.220
2007	132.184 (132.042)	-10.728	127.469	-10.199
2008	132.186 (132.042)	-10.728	127.146	-10.164
2009	131.780	-10.728	129.129	-10.432
2010	131.877 (131.780)	-10.728	128.787	-10.385
2011	131.766	-10.728	127.642	-10.272
2012	131.649	-10.728	127.905	-10.315
2013	131.577	-10.728	128.282	-10.366
2014	131.533	-10.728	128.669	-10.414
2015	131.493	-10.728	128.314	-10.381
2016	131.480	-10.728	127.786	-10.326
2017	131.456	-10.728	127.512	-10.300
2018	131.360	-10.728	127.018	-10.258
2019	131.220	-10.728	126.535	-10.222
2020	131.220	-10.728	127.705	-10.174
2021	131.220	-10.728	135.249	-10.646
2022	131.220	-10.728	117.674	-9.252
2023	131.220	-10.728	117.185	-9.267

Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Main model: Preston curves were estimated for each year by regressing PPD on log of real GDP per capita with a separate intercept for each year but a coefficient for GDP that was constant across years. In the main model, the intercepts shown in parenthesis were adjusted such that they never increased across years. The sensitivity check estimated the same models allowing the coefficient for GDP to vary across year. No adjustments were made to the intercepts in the sensitivity check. Data source: UN WPP 2022 and the Maddison Project 2023.

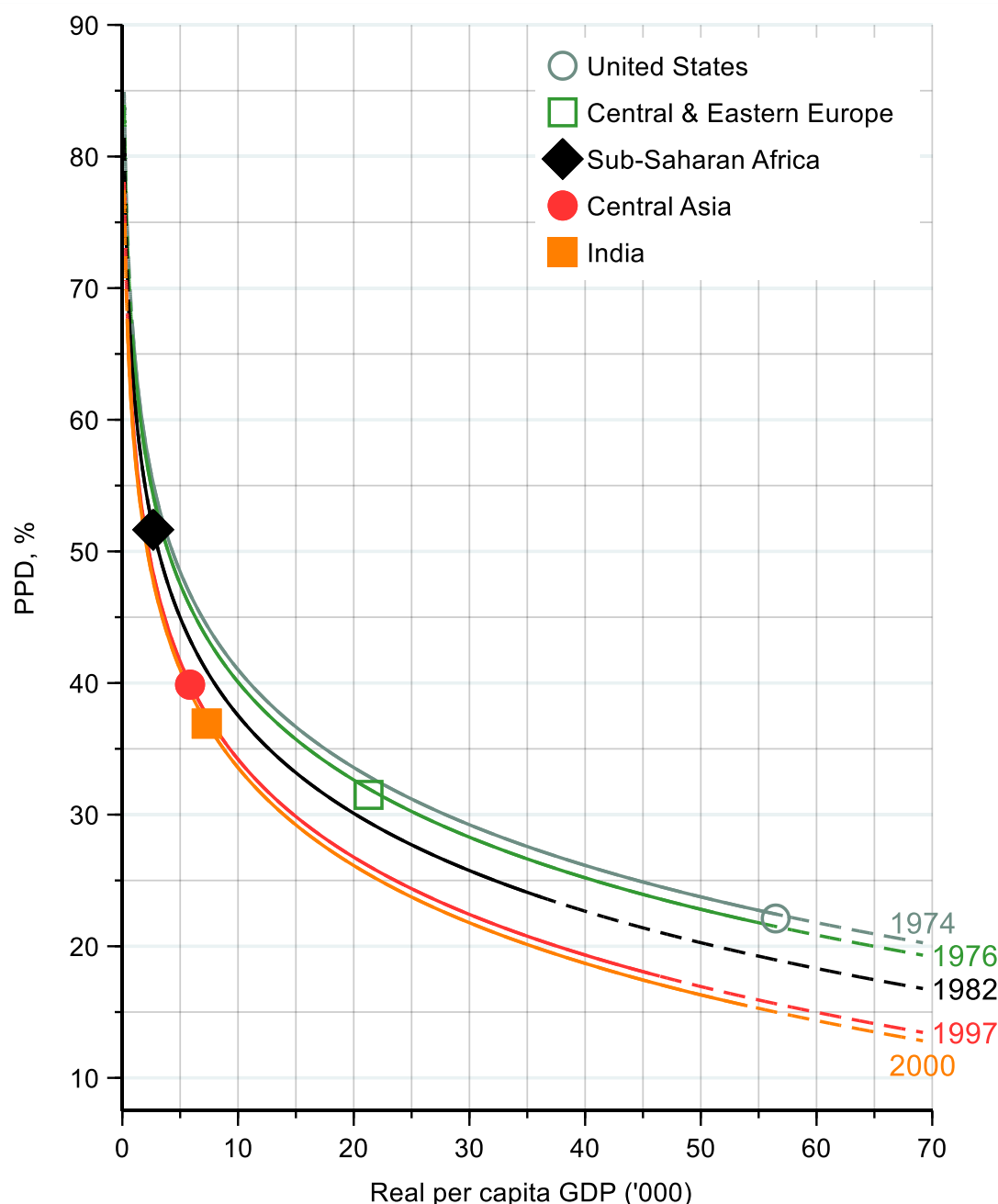
**Figure S1. Predicted PPD at USD 10 000 GDP per capita from main model (before and after adjusting the year specific intercepts) and the sensitivity specification**



Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Predicted PPD was estimated as PPD on log real GDP per capita and a separate intercept for each year. The year specific intercepts were adjusted such that they never decreased across years.

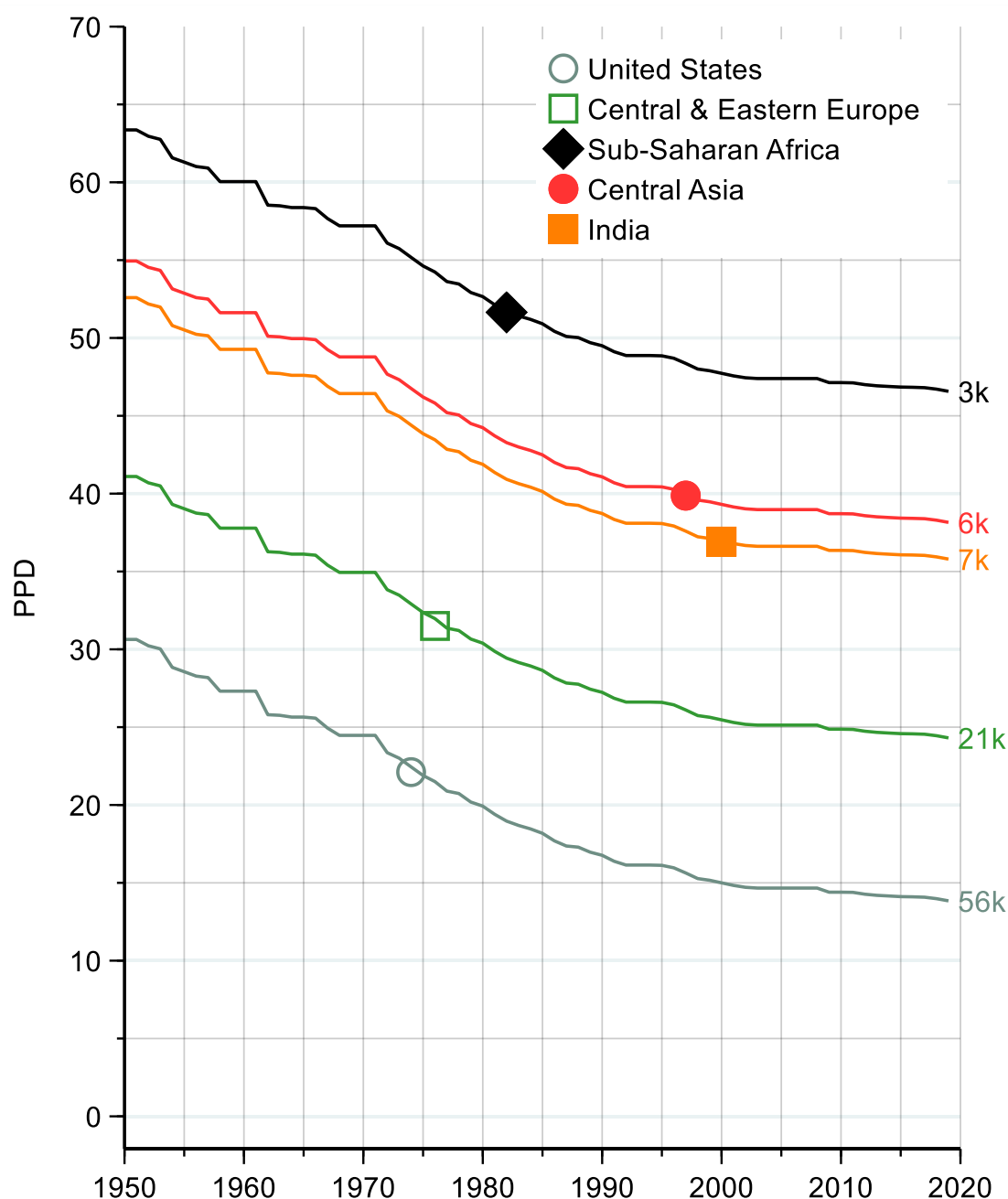


**Figure S2. Preston curves for different years (lines) and observed PPD and GDP for regions in 2019 (markers)**



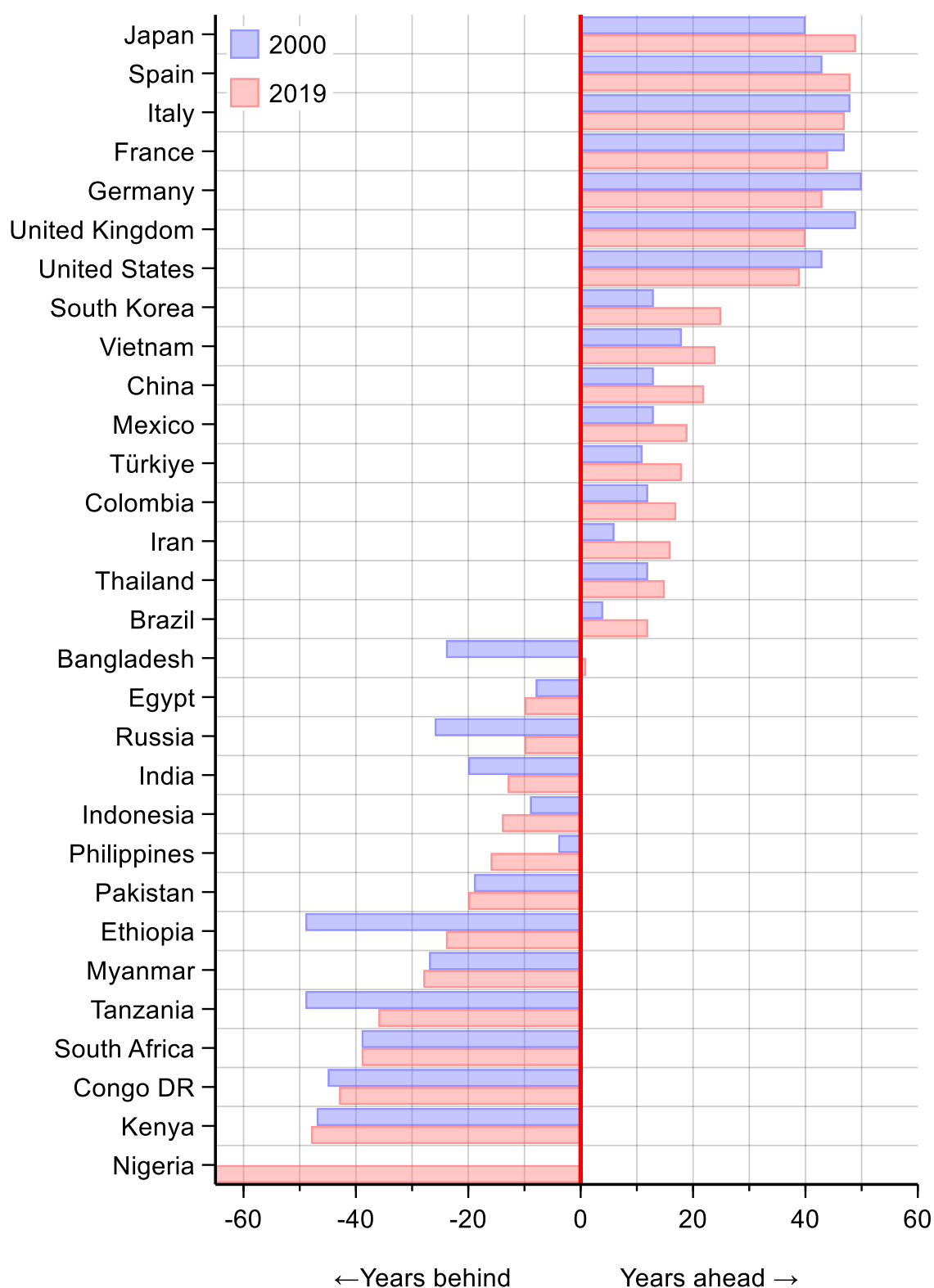
Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Preston curves are shown for years which correspond to PPD and GDP in each region in 2019 (indicated at the bottom of each curve). Preston curves were estimated for each year by regressing PPD on log of GDP with a separate intercept for each year. The slope for GDP is constant across years while the intercept varies across years. The intercepts were adjusted such that they never increased across years. The dashed line indicates GDP beyond what was observed in that year. Regions with PPD below the 2019 Preston curve are not shown. Data source: UN WPP 2022 and the Maddison Project 2023.

**Figure S3. PPD predicted by Preston curves across years for different levels of GDP (lines) and observed PPD for regions in 2019 (markers)**



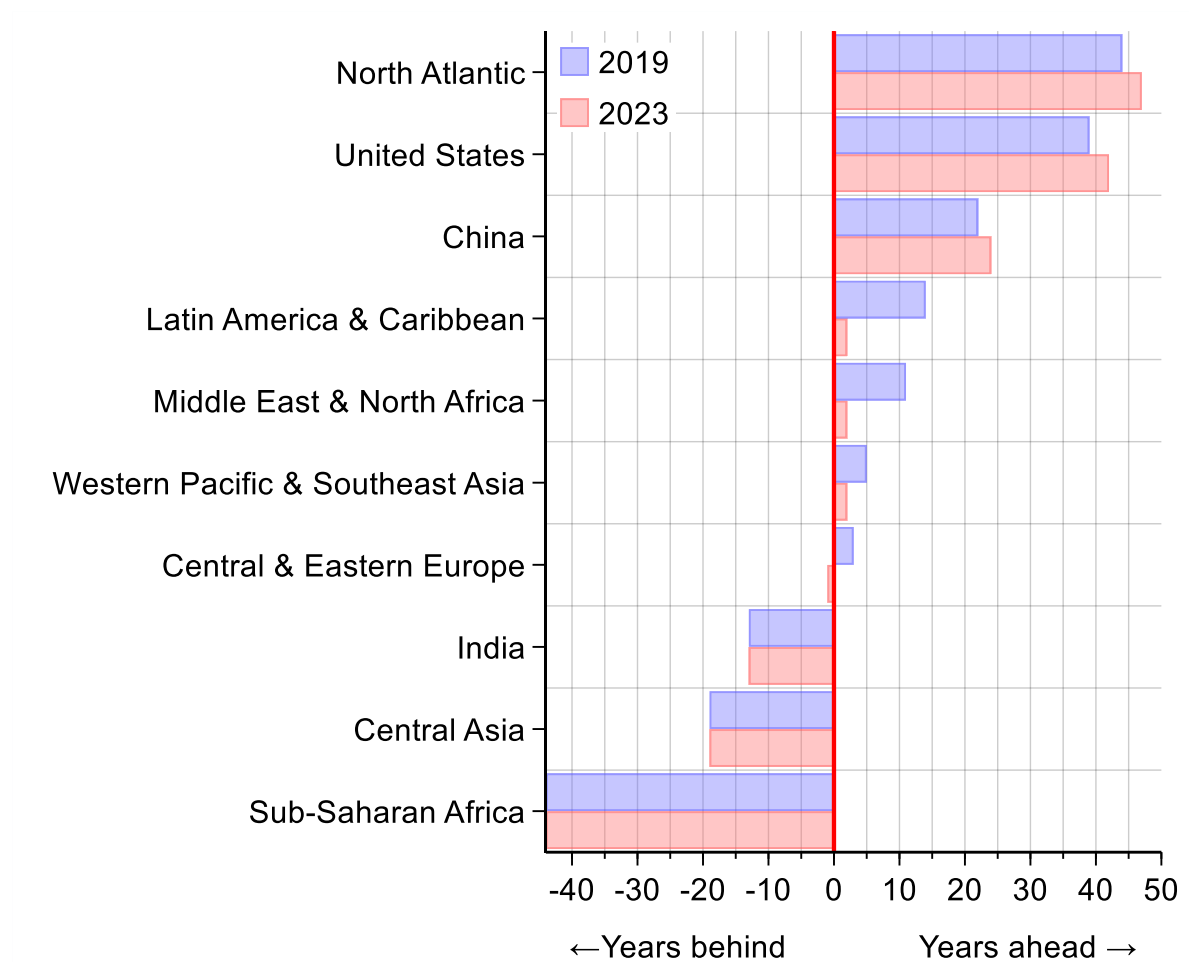
Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Preston curves were estimated for each year by regressing PPD on log of GDP with a separate intercept for each year. The slope for GDP is constant across years while the intercept varies across years. The intercepts were adjusted such that they never increased across years. Regions with probability below the 2019 Preston curve are not shown. Data source: UN WPP 2022 and the Maddison Project 2023.

**Figure S4. Years behind or ahead of the global PPD: 30 most populous countries**



Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Missing bars indicate being further behind than 1950 (the earliest available data). Data source: UN WPP 2022.

**Figure S5. Years behind or ahead of the global PPD: 2019 and 2023**



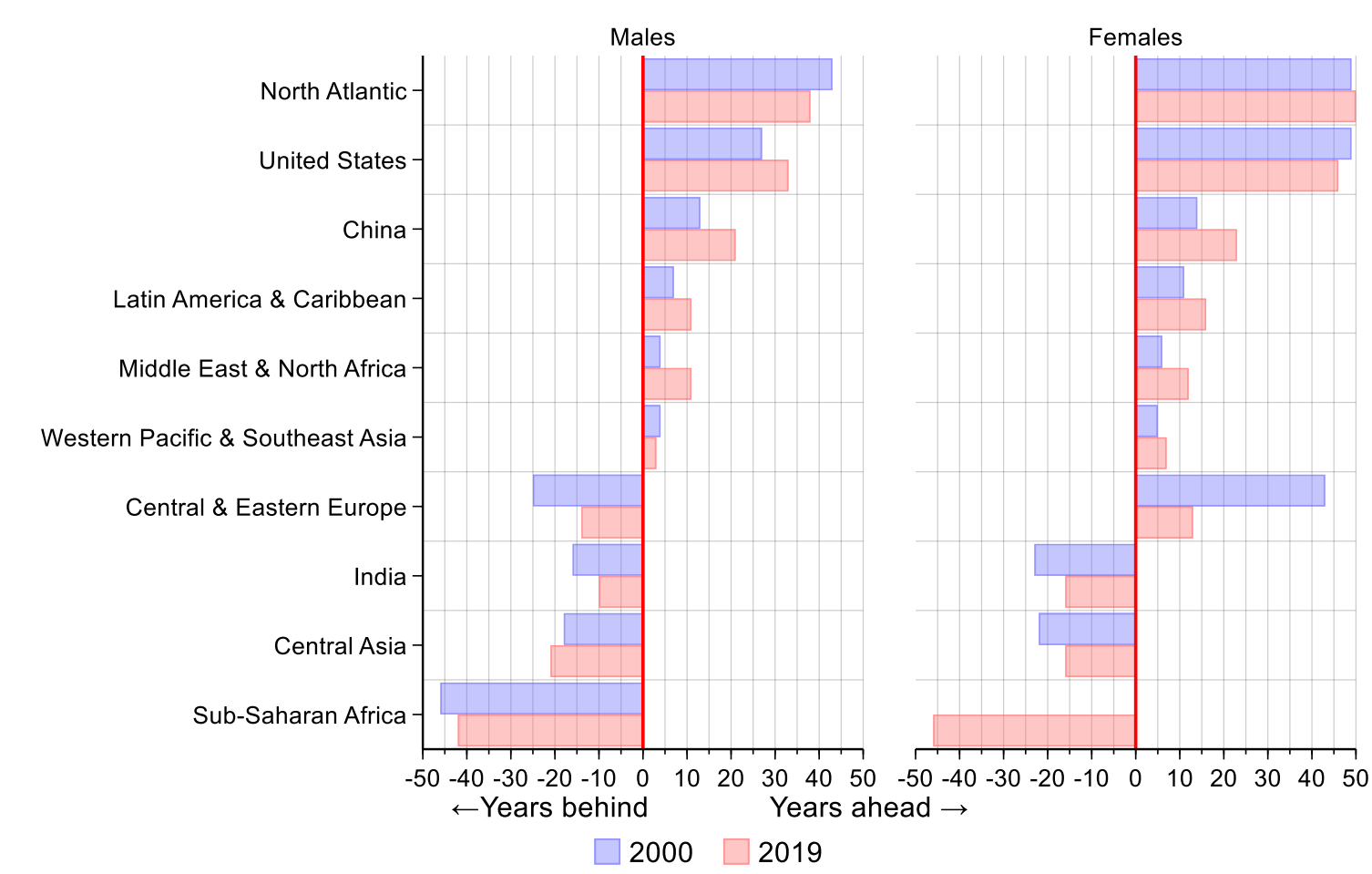
Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Data source: UN WPP 2022.

**Figure S6. Years behind or ahead of the global PPD: 30 most populous countries: 2019 and 2023**



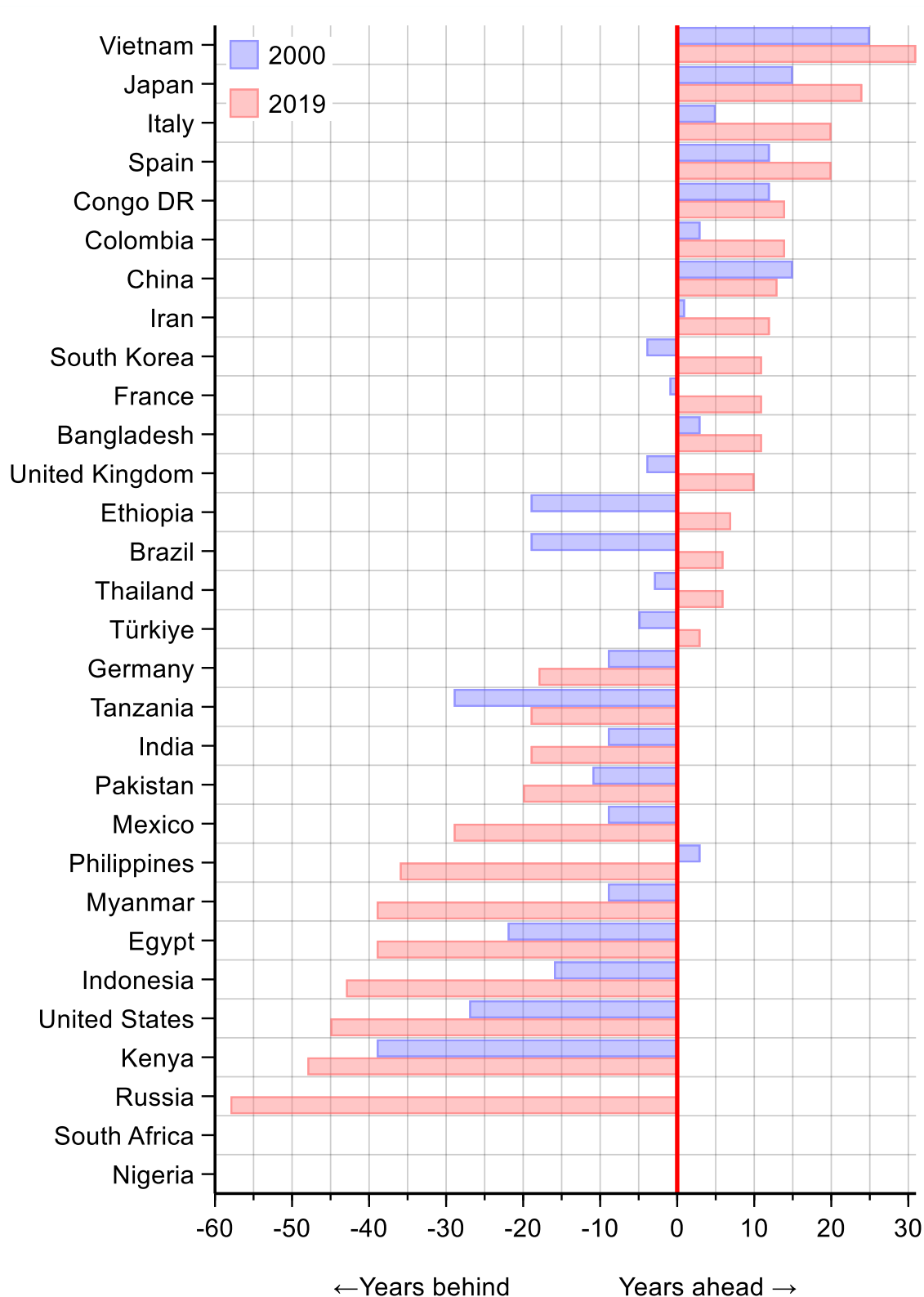
Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Missing bars indicate being further behind than 1950 (the earliest available data). Data source: UN WPP 2022.

**Figure S7. Years behind or ahead of the global PPD by sex**



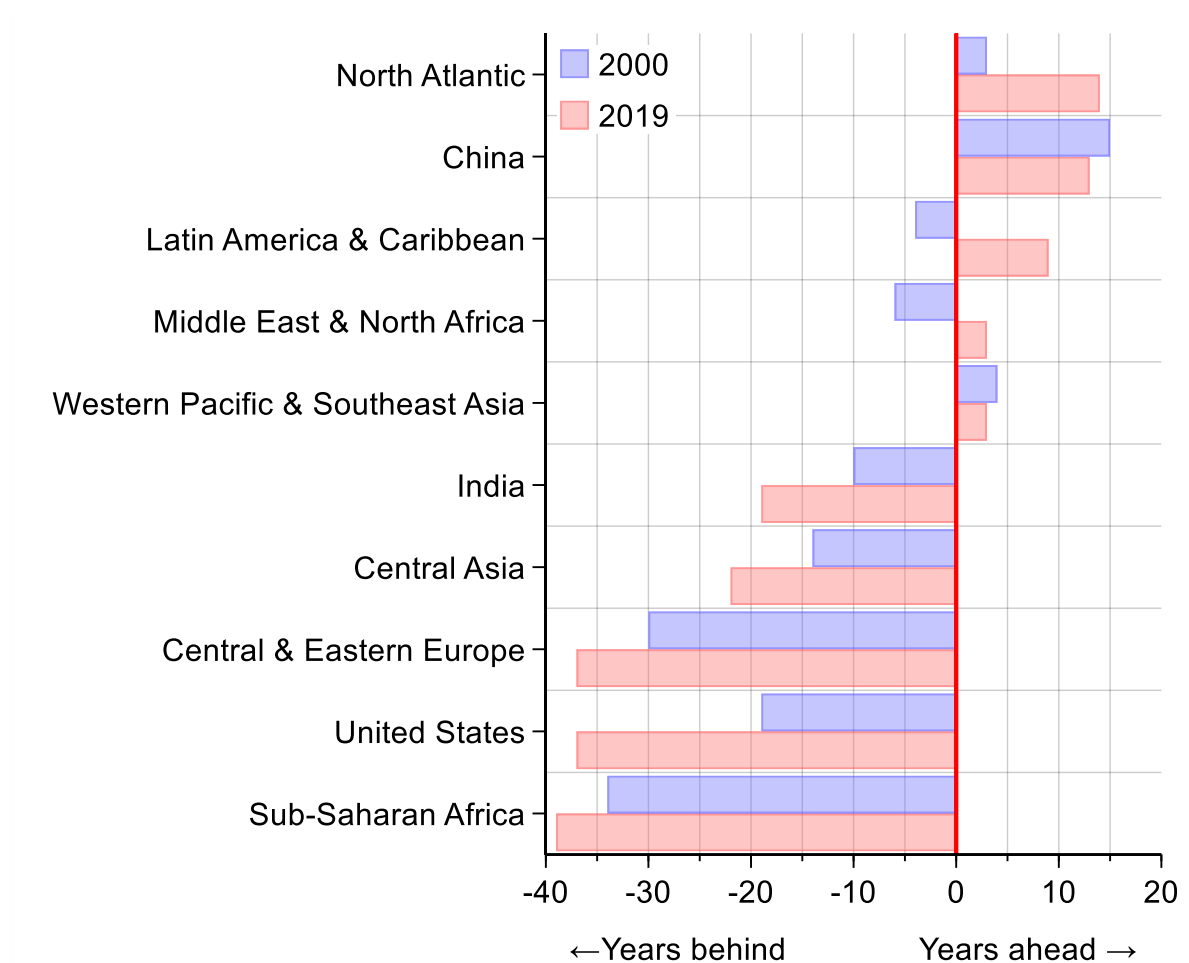
Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Data source: UN WPP 2022.

**Figure S8. Years behind or ahead of the Preston curve: 30 most populous countries**



Notes: Probability of premature death (PPD) was defined as dying before age 70 years. Missing bars indicate being further behind than 1950 (the earliest available data). Data source: UN WPP 2022 and the Maddison Project 2023.

**Figure S9. Years behind or ahead relative to PPD predicted by current GDP:  
Alternative specification of PPD-GDP relationship**



Notes: Probability of premature death (PPD) was defined as dying before age 70 years. See Sensitivity analyses section for details. Data source: UN WPP 2022 and the Maddison Project 2023.