

SOCIAL PROGRESS INSIGHTS FOR COVID-19 CHALLENGES

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Abstract

Which countries will be hardest hit by Covid-19? Which countries will need the most support from the international community to tackle the epidemic? These questions are hard to answer because Covid-19 is such a new phenomenon and the data is so incomplete. However, by looking at mortality from other infectious diseases, this paper identifies three components of the Social Progress Index that may be associated with different levels of 'Social Resilience' to Covid-19 - Water and Sanitation, Shelter, and Health and Wellness. Broadly, poorer countries are less resilient. However, we find that there are wide variations in Social Resilience among low and lower-middle income countries that could have significant implications for the levels of support countries will need. Among high and upper-middle income countries there is less variation but there remain significant outliers.

In the midst of the ongoing global Covid-19 pandemic we have explored what insights the Social Progress Index can provide to help inform the response, using data from 51 indicators across more than 200 countries. While the Social Progress Index does not directly include Covid-19 cases, the Index does consider deaths from infectious diseases¹, i.e. diseases caused by bacteria or viruses that can be transmitted directly or indirectly, from one person to another. Assuming that factors that inhibit the spread of other infectious diseases also inhibit the spread of Covid-19, the Social Progress Index may, therefore, offer insight into different countries' resilience.

Infectious diseases and social progress

Understanding if and how the Social Progress Index and its various components are associated with better performance on deaths from infectious diseases may provide insight on how well-prepared countries are for this crisis, beyond what a simple income (GDP) measure would indicate.

We find that eight of the 12 components of the Social Progress Index have a strong and positive relationship² with deaths from infectious diseases. These are: Nutrition & Basic Medical Care, Water & Sanitation, Shelter, Health & Wellness, Access to Basic Knowledge, Access to Information and Communications, Personal Freedom & Choice, and Access to Advanced Education. (See table 1). Our hypothesis is that higher scores on these components may be linked with lower risk of death from infectious diseases in general, and possibly Covid-19, which we call 'Social Resilience to Infectious Diseases' (SRID).

Table 1 / Social Progress Index components and R²

SPI Components	R ²
Nutrition and Basic Medical Care	0.823
Water and Sanitation	0.744
Shelter	0.746
Personal Safety	0.358
Access to Basic Knowledge	0.674
Access to Information and Communications	0.546
Health and Wellness	0.662
Environmental Quality	0.068
Personal Rights	0.120
Personal Freedom and Choice	0.588
Inclusiveness	0.146
Access to Advanced Education	0.603

¹ Source: [Institute for Health Metrics and Evaluation](#), defined as age-standardized mortality rate from deaths caused by HIV/AIDS, tuberculosis, diarrhea, intestinal infections, respiratory infections, otitis media, meningitis, encephalitis, diphtheria, whooping cough, tetanus, measles, varicella, herpes zoster, malaria, Chagas disease, leishmaniasis, trypanosomiasis, schistosomiasis, cysticercosis, cystic echinococcosis, lymphatic filariasis, onchocerciasis, trachoma, dengue, yellow fever, rabies, intestinal nematode infections, foodborne trematodiasis, leprosy, ebola, zika virus, guinea worm disease, sexually transmitted diseases excluding HIV, hepatitis, and other infectious diseases per 100,000 people.

² Using exponential trend.

For some of these components there is a clear conceptual link with resilience to Covid-19. For example, access to Water and Sanitation is required for effective handwashing. For others, such as Personal Freedom and Choice, the link is less obvious. To construct a measure of Social Resilience to Infectious Diseases (SRID) we followed three steps:

1. From the eight components significantly correlated with deaths from infectious diseases, we excluded Nutrition and Basic Medical Care, which already includes deaths from infectious diseases.
2. We constructed two measures of SRID, based on a simple average of the components: a broader measure using the seven remaining components that have a strong and significant relationship with deaths from infectious diseases and a narrower measure using only three components – Water and Sanitation, Shelter, and Health and Wellness – that have the closest conceptual fit.
3. We compared the broad and narrow SRID measures and found a coefficient of correlation of 0.98³, which indicates that the broad and the narrowly defined measures of Social Resilience to Infectious Diseases are nearly identical. Since we can use the narrow measure as a reliable proxy, we based this analysis on the simpler measure – narrowly defined SRID.

There are two key caveats to this approach:

1. Resilience is not sufficient to forecast actual mortality from Covid-19. The actual impact will be influenced by numerous different factors such as age structure, population density or air pollution exposure. SRID is only one piece of the jigsaw.
2. Factors that seem to be less important for reducing deaths from other infectious diseases (and were therefore omitted from our analyses) may be significant for tackling Covid-19. For example, the relationship between Personal Rights and deaths from infectious diseases is weak; however, the lack of Personal Rights may have helped countries like China and Singapore more easily implement preventative and tracking measures to tackle the spread of such a virus. Or, greater Inclusiveness may mean that societies are more cohesive and better at respecting social distancing measures. It is too early in the epidemic and the data on Covid-19's impact is too incomplete to explore these at present.

Social resilience to infectious diseases: key findings

The results for the SRID measure for the top 20 and bottom 20 countries are in Table 2 (the full ranking of 169 countries is in Appendix A). Countries with a higher score are stronger across the three components of the Social Progress Index model – Water and Sanitation, Shelter, and Health and Wellness – that are associated with lower levels of mortality from infectious diseases. However, other factors will also contribute to the impact of Covid-19. For example, the top performing country, Switzerland, may have the highest resilience but it may also be more vulnerable to Covid-19 than other, lower performing, countries because it has an older and more densely located population.

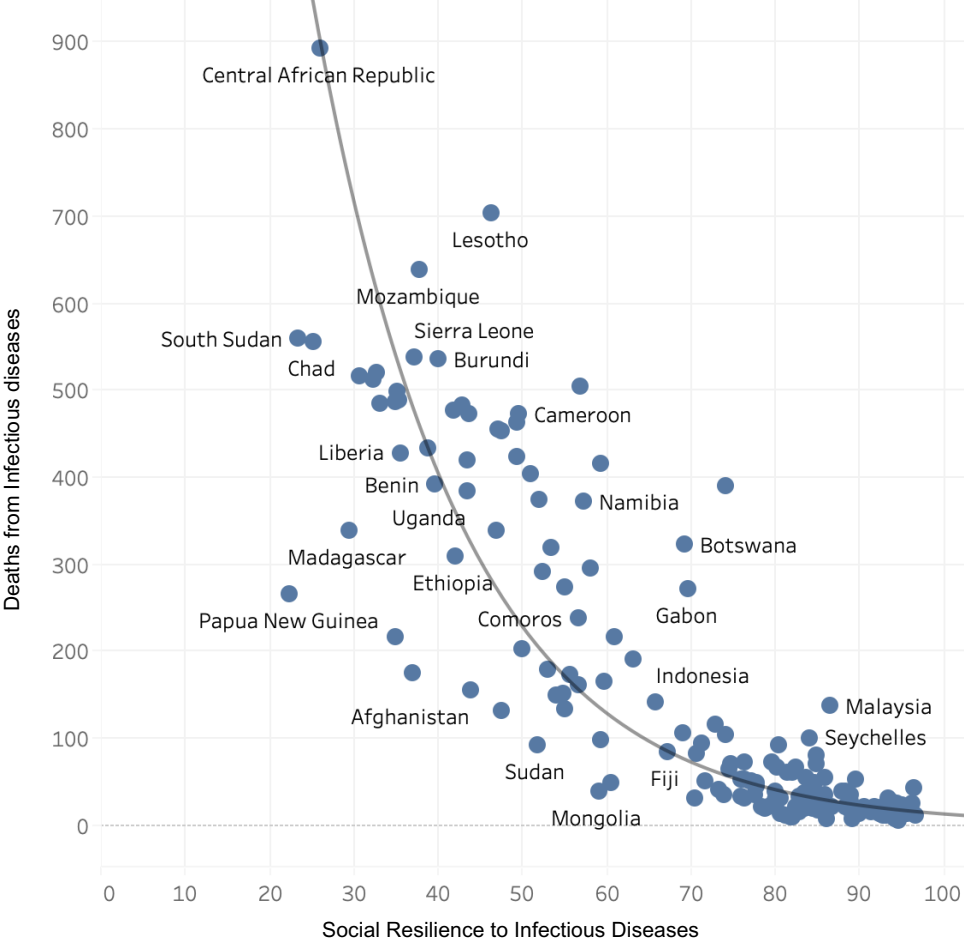
³ This relationship was established for 2014-2019 SRID results.

Table 2 / Top and bottom 20 countries by SRID Score

Country	Score	rank	Country	Score	rank
Switzerland	96.67	1	Burundi	40.02	150
Singapore	96.45	2	Benin	39.67	151
Japan	96.22	3	Togo	38.75	152
France	95.69	4	Mozambique	37.80	153
Norway	95.48	5	Sierra Leone	37.12	154
Iceland	95.40	6	Haiti	36.89	155
Korea, Republic of	94.98	7	Liberia	35.57	156
Netherlands	94.70	8	Eritrea	35.31	157
Austria	94.68	9	Guinea	35.06	158
Sweden	94.63	10	Solomon Islands	34.96	159
Canada	94.58	11	DR Congo	34.96	160
Spain	94.55	12	Burkina Faso	33.04	161
Belgium	94.48	13	Guinea-Bissau	32.78	162
New Zealand	94.29	14	Niger	32.24	163
Finland	94.28	15	Somalia	30.73	164
Luxembourg	94.27	16	Madagascar	29.34	165
Israel	94.20	17	Central African Republic	26.05	166
Italy	94.13	18	Chad	25.09	167
Denmark	93.93	19	South Sudan	23.30	168
United Kingdom	93.89	20	Papua New Guinea	22.38	169

SRID shows a strong and significant relationship (R-squared 0.797) with deaths from infectious diseases (which we are using as a loose proxy for Covid-19). This indicates that better performance on SRID is associated with fewer deaths from infectious diseases. The relationship is stronger for countries with lower performance on SRID. Countries with SRID scores over 80 achieve fewer than 100 deaths per 100,000 population. The two exceptions are Malaysia and the Seychelles.

Figure 1 / Deaths from infectious diseases and Social Resilience to Infectious Diseases



Is there a clear pattern by level of income?

So far in terms of spread, Covid-19 has most significantly impacted high-income countries, but numerous concerns have been raised, for example by the [Economist](#), [Mo Ibrahim Foundation](#), and [Imperial College](#), about its potential effect on lower income countries. Our data support these concerns. Figure 1 shows a strong and significant relationship between GDP per capita and the SRID measure (R-Squared 0.813) – poorer countries are likely to have lower resilience to Covid-19.

However, one of the key findings of the Social Progress Index is that economic measures, such as GDP, do not fully explain social progress outcomes. The same may be true of Social Resilience to Infectious Diseases – the relationship between SRID and GDP per capita is strong but GDP does not completely explain resilience. Even at similar levels of GDP per capita, some countries may be less resilient than others and therefore at greater risk. This is particularly important for decisions on aid to middle and low income countries that will need international assistance in tackling the epidemic.

Table 3 shows the minimum, maximum, median, average, spread and coefficient of variation for SRID score for each income group of countries (as defined by the [World Bank](#)). This shows that, the coefficient of variation, which measures the degree of variation within each income group, increases with declining incomes, demonstrating that the performance of poorer countries varies more than that of richer countries.

Figure 2 / SRID and GDP per capita

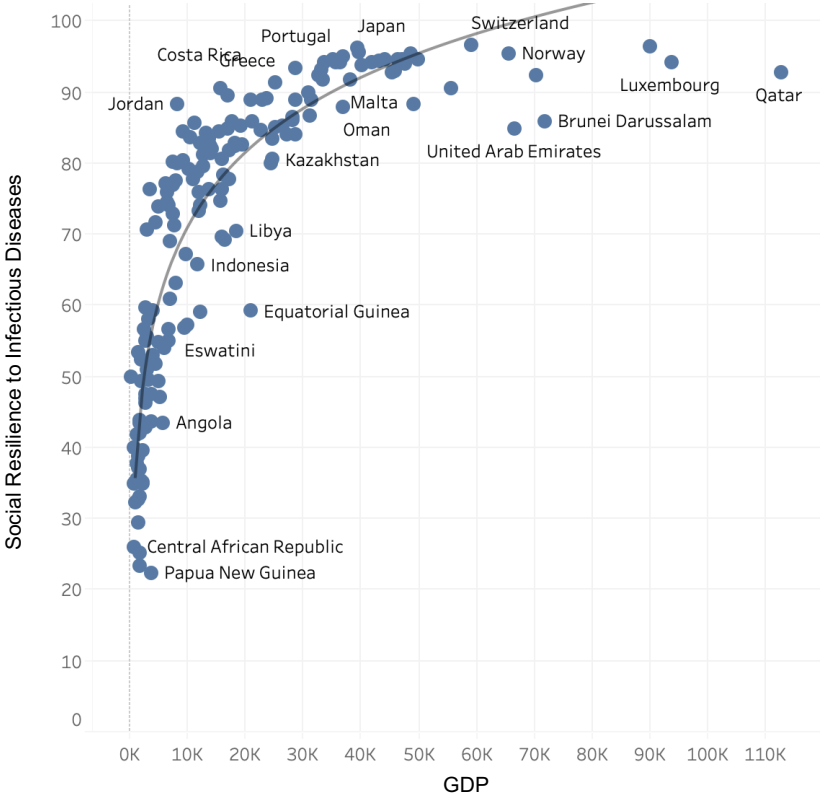


Table 3 / Summary statistics of income groups on SRID⁴

Income group	Number of countries	Average Score	Median Score	Maximum Score	Minimum Score	Coefficient of Variation	Spread
High	48	91.56	92.77	96.67	84.12	4.03%	12.56
Upper middle	48	79.26	81.37	90.55	57.17	8.67%	33.38
Lower middle	44	59.41	56.66	85.71	22.38	23.47%	63.33
Low	29	40.25	37.80	70.58	23.30	27.41%	47.28

High-Income Countries

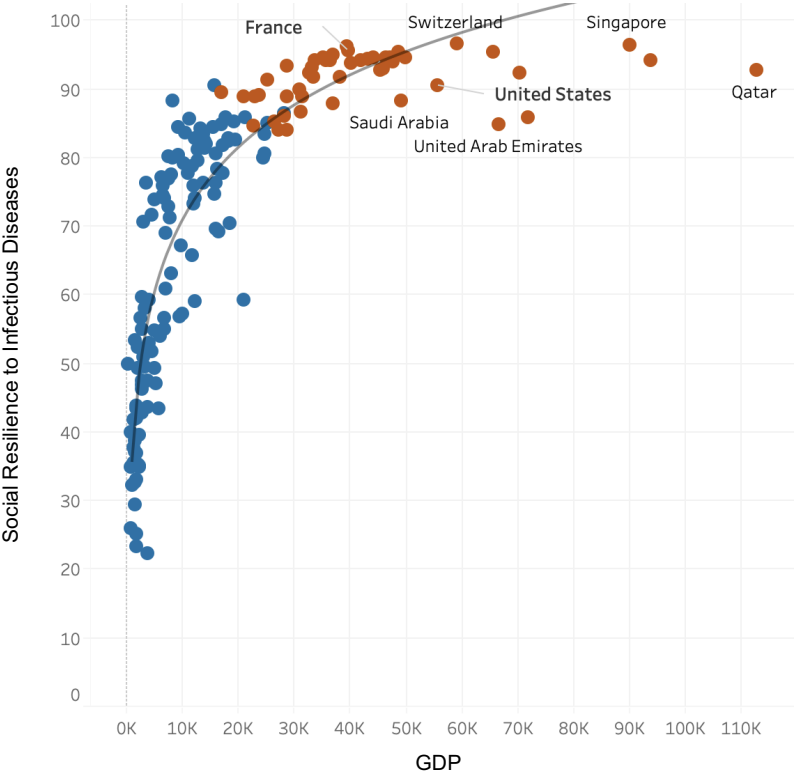
High-income countries (highlighted in Figure 3) achieved an average of 91.55, with Switzerland performing best (and best overall on SRID) and Seychelles scoring last with 84.12. This represented a spread of only 12.56 points and only 4.03% degree of variation. This is notable given the wide spread of wealth of these countries (\$16,839 for Barbados to \$112,531.5 for

⁴ Number of countries refers to the number of countries within each income group for which the SRID measure was calculated

Qatar⁵), although this also reflects that countries are hitting maximum scores on some of these indicators, such as access to piped water, and can improve no further.

However, within this category there are some clear under-performers among resource rich countries such as Qatar, United Arab Emirates and Saudi Arabia. We also see that the United States ranks just 31st within the group (score 90.54).

Figure 3 / SRID and GDP per capita: High-income Countries



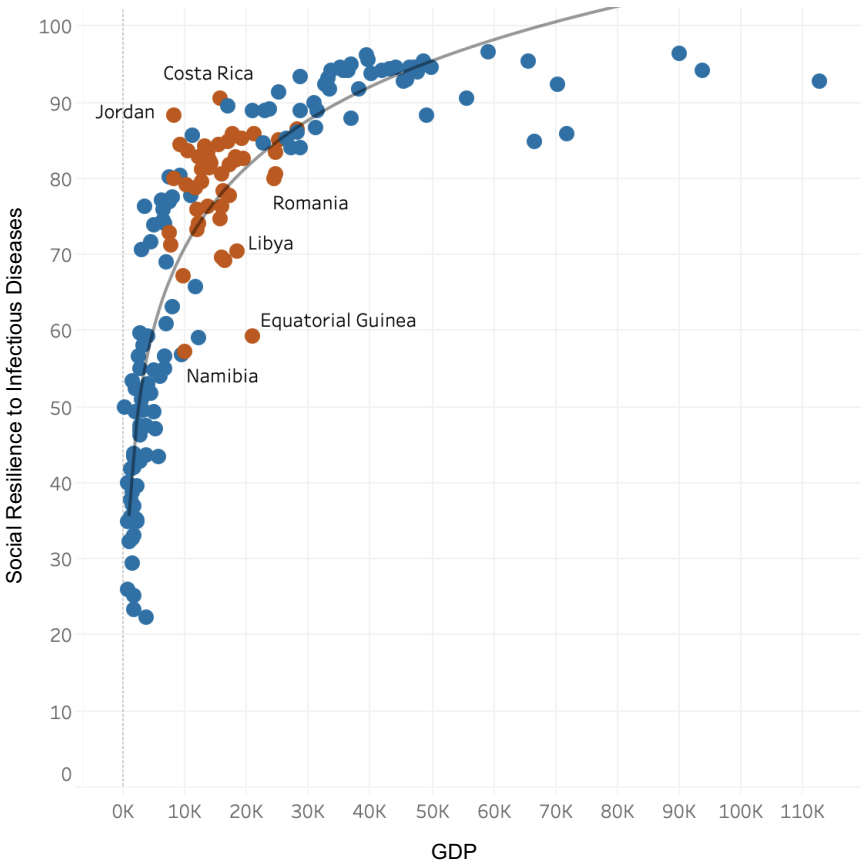
Upper Middle-Income Countries

Upper middle-income countries had a spread of 33.38 points and coefficient of variation of 8.67%, with Costa Rica being the top performer (90.55), followed closely by Jordan (88.40). Twelve upper middle-income countries⁶ perform better than the worst scoring high-income country. For instance, Costa Rica performs better than the United States. Namibia (57.17) and Equatorial Guinea (59.28) rank last within this group, following the general under-performance of resource-rich countries. Two EU member states – Bulgaria (82.72) and Romania (80.04) – ranked worse than Russia (83.53), and Romania also performed worse than Brazil (82.06).

⁵ GDP per capita based on purchasing power parity (PPP), most recent year available on August 8, 2019. Source: World Bank

⁶ Costa Rica, Jordan, Malaysia, Belarus, Mauritius, Iran, Turkey, Thailand, Iraq, Cuba, Armenia, Colombia

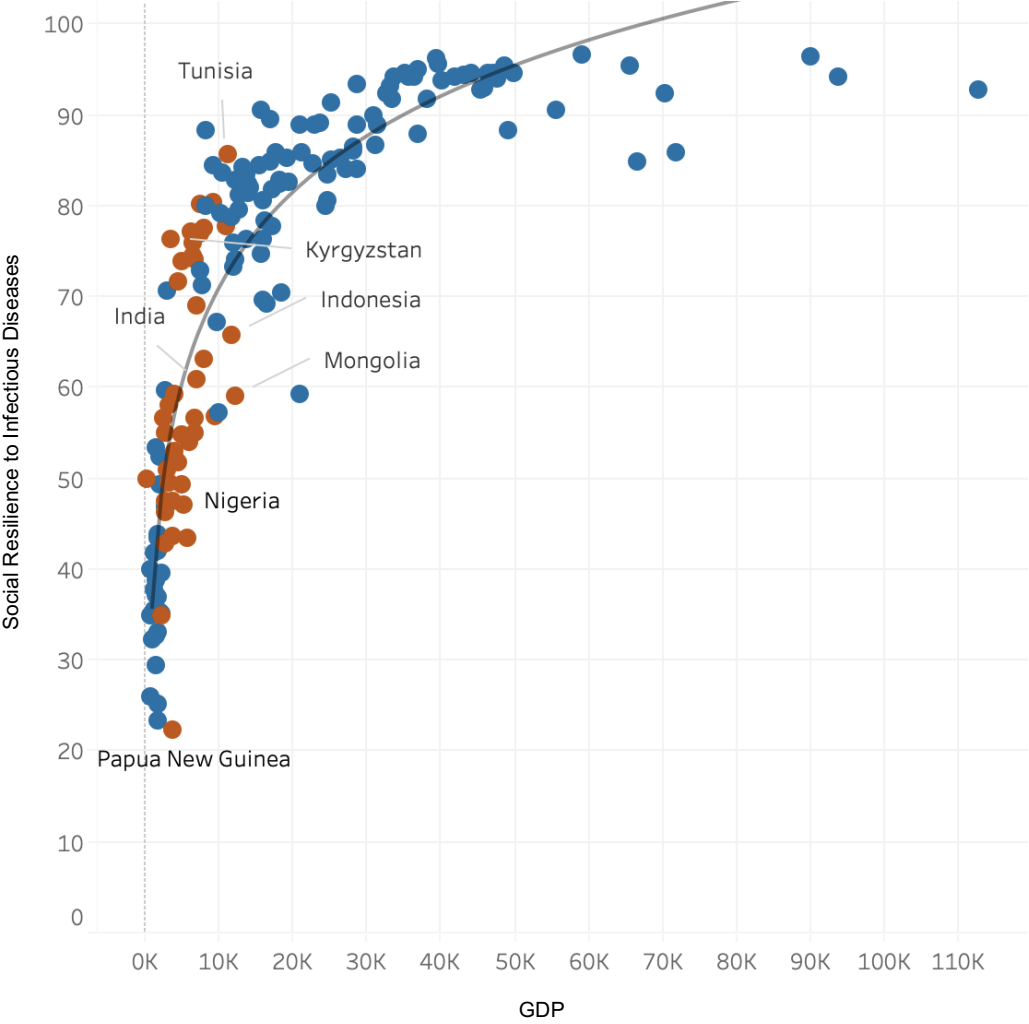
Figure 4 / SRID and GDP per capita: Upper Middle-income Countries



Lower Middle-Income Countries

Lower middle-income countries are the most diverse group in terms of performance highs and lows. This represents a spread of more than 63 points and coefficient of variation 23.47%. Tunisia takes the lead (85.71) and scores more than 5 points ahead of the second-best performer, Bhutan (80.49), and better than the worst performing high income country (the Seychelles). Papua New Guinea takes the last position not just within its respective income group, but also overall with

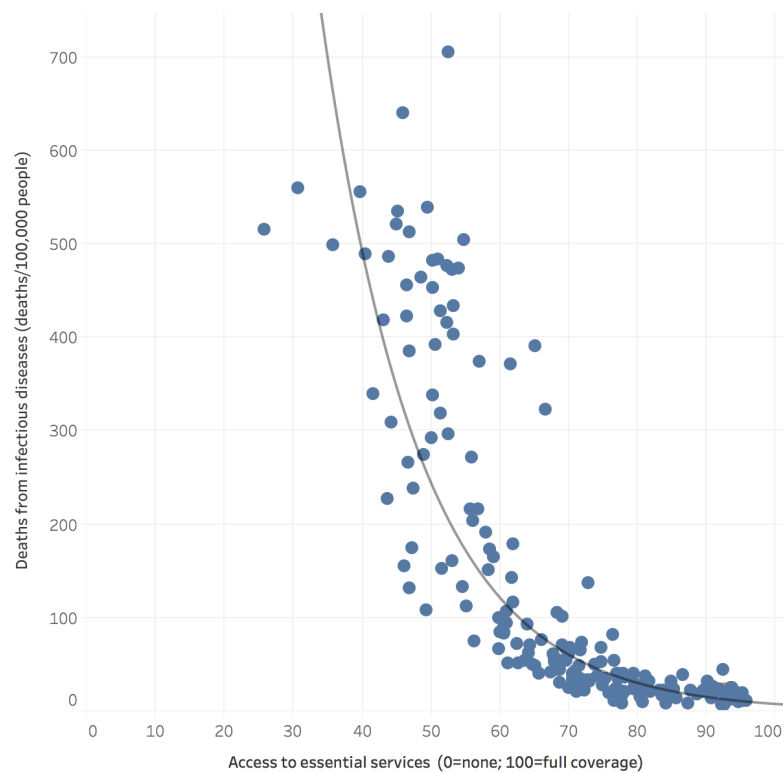
Figure 5 / SRID and GDP per capita: Lower Middle-income Countries



Infobox 1 / Access to essential care seems to be a key piece for tackling infectious diseases

We also explored the relationship between deaths from infectious diseases and two healthcare indicators: access to essential services and access to quality healthcare, from the [Institute for Health Metrics and Evaluation](#) and the [Varieties of Democracy](#) respectively.

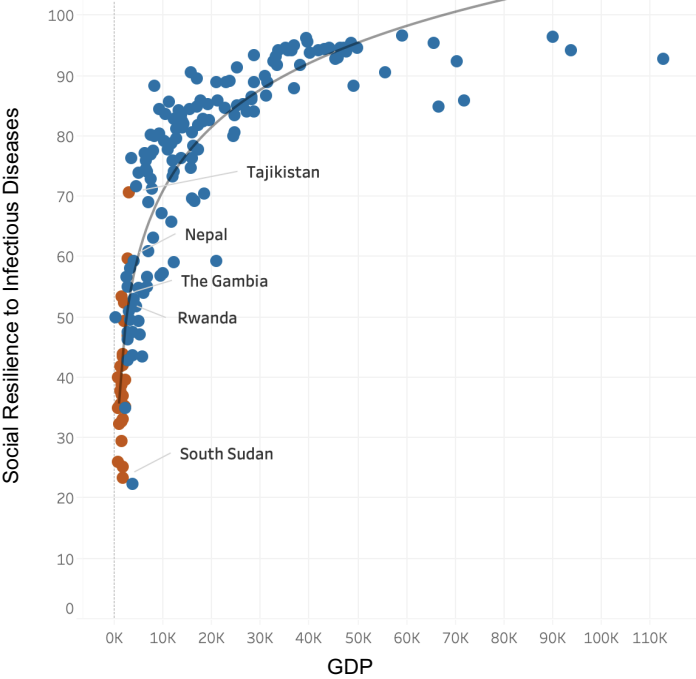
The finding was hardly surprising: access to essential health care seems more important for keeping the number of deaths from infectious diseases low than equal access to quality healthcare. Better access to health facilities, doctors and vaccinations limits the number of deaths from infectious disease. Although this relationship is not linear, it is strong and significant ($R^2 = 0.81$). Countries with a score over 70 (on access to essential services) successfully limit the number of deaths to fewer than 100 per 100,000 people.



Low-Income Countries

The best scoring low-income country is Tajikistan (70.58), followed by Nepal (59.63) and The Gambia (53.32), while South Sudan ranked last within the group scoring 23.30. While the low-income group did not have the highest spread, it had the largest coefficient of variation reflecting the varying performance of its members. Rwanda (52.45) and Ethiopia (42.05) both performed above the median and average performance of the low-income group.

Figure 6 / SRID and GDP per capita: Low Income Countries



Conclusion

The Social Progress Index helps to demonstrate that countries' Social Resilience to Infectious Diseases decreases with declining economic performance. However, there are outliers which indicate that economic performance is not the sole determinant of countries' capacity to tackle the current pandemic. For example, the United States performs behind its G7 peers and ranks 32nd overall on SRID. Within the EU, Romania and Bulgaria are significantly more vulnerable than their GDPs per capita might suggest. On the other hand, countries such as Bhutan, Costa Rica, Tunisia and Tajikistan achieve higher levels of Social Resilience to Infectious Diseases than would be predicted by their income level. We also find that the resilience of resource rich countries, such as the United Arab Emirates and Saudi Arabia, does not correspond with their economic means. Similarly, at lower levels of GDP per capita, countries with natural resource-based economies such as Namibia, Mongolia, Equatorial Guinea and Nigeria may be more vulnerable to Covid-19 and in greater need of support than their GDP per capita would suggest.

Appendix A / Countries by SRID Score

Country	Score	Rank	Country	Score	Rank
Switzerland	96.67	1	Egypt	77.68	86
Singapore	96.45	2	Ukraine	77.55	87
Japan	96.22	3	Uzbekistan	77.06	88
France	95.69	4	Morocco	76.93	89
Norway	95.48	5	Kyrgyzstan	76.36	90
Iceland	95.40	6	Suriname	76.35	91
Korea, Republic of	94.98	7	Azerbaijan	76.23	92
Netherlands	94.70	8	Moldova	75.93	93
Austria	94.68	9	Paraguay	75.86	94
Sweden	94.63	10	Dominican Republic	74.79	95
Canada	94.58	11	Vietnam	74.52	96
Spain	94.55	12	South Africa	74.13	97
Belgium	94.48	13	Cabo Verde	74.08	98
New Zealand	94.29	14	Nicaragua	73.99	99
Finland	94.28	15	Sri Lanka	73.23	100
Luxembourg	94.27	16	Guatemala	72.92	101
Israel	94.20	17	Honduras	71.73	102
Italy	94.13	18	Guyana	71.34	103
Denmark	93.93	19	Tajikistan	70.58	104
United Kingdom	93.89	20	Libya	70.51	105
Portugal	93.36	21	Gabon	69.68	106
Cyprus	93.15	22	Botswana	69.28	107
Germany	93.00	23	Bolivia	68.96	108
Australia	92.82	24	Fiji	67.14	109
Qatar	92.73	25	Indonesia	65.71	110
Ireland	92.41	26	Philippines	63.23	111
Slovenia	92.32	27	India	60.94	112
Czech Republic	91.77	28	Korea, Democratic Republic of	60.46	113
Malta	91.67	29	Nepal	59.63	114
Greece	91.31	30	Bangladesh	59.33	115
Costa Rica	90.55	31	Equatorial Guinea	59.28	116
United States	90.54	32	Mongolia	59.00	117
Estonia	89.97	33	Senegal	58.01	118
Barbados	89.49	34	Namibia	57.17	119
Croatia	89.03	35	Eswatini	56.92	120
Uruguay	88.99	36	Laos	56.66	121
Poland	88.95	37	Comoros	56.65	122

Slovakia	88.92	38	Sao Tome and Principe	55.60	123
Chile	88.88	39	Djibouti	54.98	124
Jordan	88.40	40	Timor-Leste	54.92	125
Saudi Arabia	88.31	41	Pakistan	54.86	126
Oman	87.88	42	Myanmar	54.10	127
Lithuania	86.72	43	The Gambia	53.32	128
Malaysia	86.39	44	Cambodia	52.89	129
Hungary	85.99	45	Rwanda	52.45	130
Brunei Darussalam	85.88	46	Ghana	51.88	131
Belarus	85.80	47	Sudan	51.67	132
Mauritius	85.79	48	Kenya	50.88	133
Tunisia	85.71	49	Mauritania	50.00	134
Latvia	85.30	50	Cameroon	49.64	135
Iran	85.23	51	Congo, Republic of	49.42	136
Turkey	85.11	52	Mali	49.28	137
United Arab Emirates	84.82	53	Vanuatu	47.58	138
Thailand	84.76	54	Côte d'Ivoire	47.57	139
Panama	84.69	55	Nigeria	47.04	140
Iraq	84.53	56	Tanzania	46.81	141
Cuba	84.52	57	Lesotho	46.30	142
Armenia	84.48	58	Afghanistan	43.75	143
Colombia	84.16	59	Zambia	43.65	144
Trinidad and Tobago	84.13	60	Angola	43.46	145
Seychelles	84.12	61	Uganda	43.35	146
Ecuador	83.65	62	Zimbabwe	42.78	147
Russia	83.53	63	Ethiopia	42.05	148
Maldives	83.48	64	Malawi	41.81	149
Mexico	82.77	65	Burundi	40.02	150
Albania	82.76	66	Benin	39.67	151
Bulgaria	82.72	67	Togo	38.75	152
Algeria	82.41	68	Mozambique	37.80	153
Argentina	82.40	69	Sierra Leone	37.12	154
Brazil	82.06	70	Haiti	36.89	155
Republic of North Macedonia	81.96	71	Liberia	35.57	156
Montenegro	81.89	72	Eritrea	35.31	157
Grenada	81.43	73	Guinea	35.06	158
Bosnia and Herzegovina	81.30	74	Solomon Islands	34.96	159
Kazakhstan	80.58	75	Congo, Democratic Republic of	34.96	160
Serbia	80.50	76	Burkina Faso	33.04	161
Bhutan	80.49	77	Guinea-Bissau	32.78	162

El Salvador	80.17	78	Niger	32.24	163
Romania	80.04	79	Somalia	30.73	164
Jamaica	79.96	80	Madagascar	29.34	165
Peru	79.68	81	Central African Republic	26.05	166
Georgia	79.09	82	Chad	25.09	167
Lebanon	78.71	83	South Sudan	23.30	168
China	78.28	84	Papua New Guinea	22.38	169

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