

Note on the Save the Children 'Child Development Index' (CDI)

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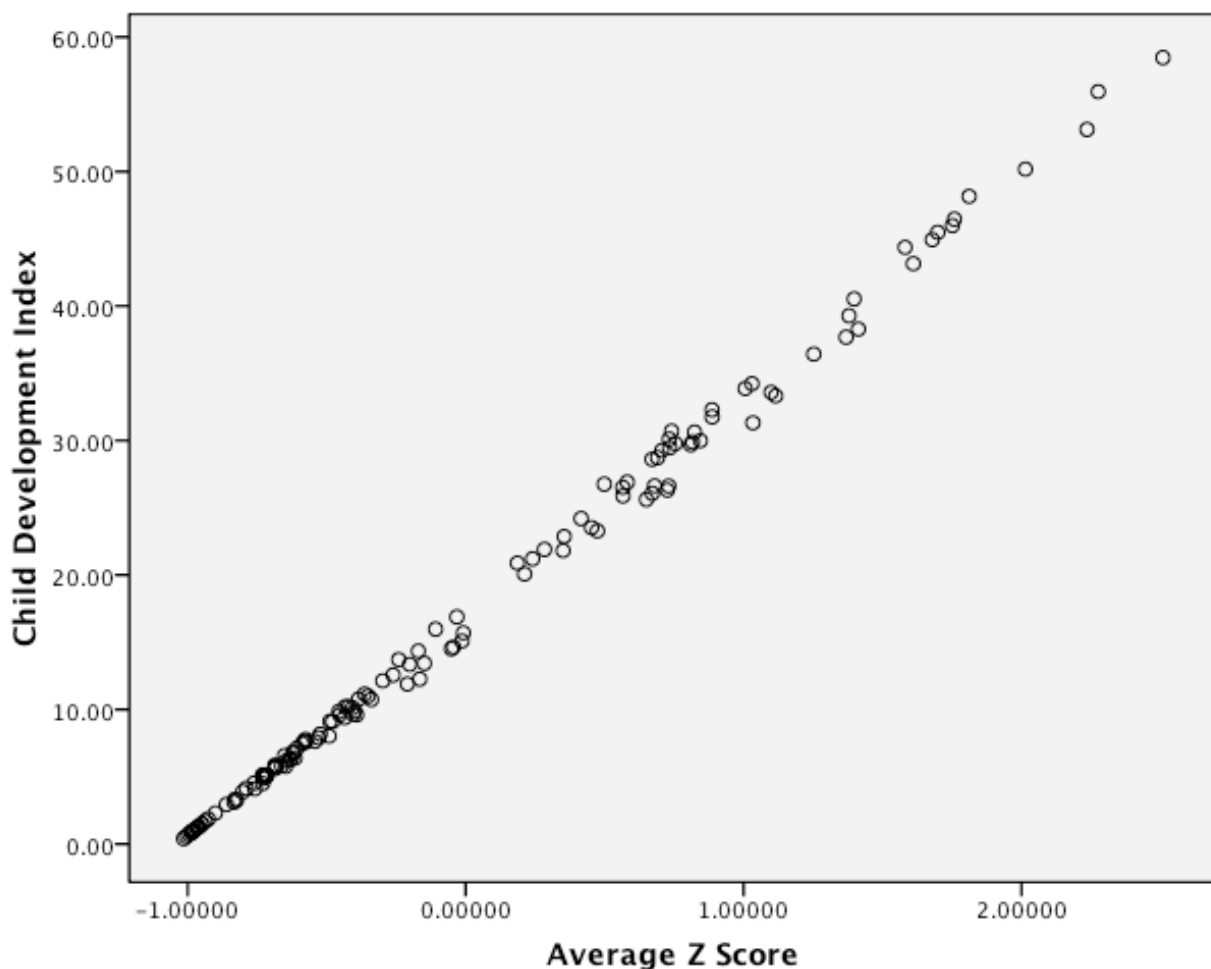
The Child Development Index¹ is "an index combining performance measures specific to children - primary education, child health and child nutrition". Or, to be more specific, net non-enrollment ratio in primary education (%), under-five mortality rate (per 1,000 births) and underweight children under 5 years (%).

The average of these three variables is the CDI. However, this method of aggregation presupposes that these variables can be compared with one another and are on the same scale. This is not the case: the education variable ranges from 0-81%; the health variable from 0.8-79.4 (per 1000s, so also on a different scale); the nutrition variable from 0-47.5%.

I have used two alternative methods:

- By using Z-scores, the variable's effect on the data is negated, thus allowing underlying characteristics of the data sets to be compared: this allows data on different scales to be compared, by bringing them to a common scale. This allows us to see how countries compare to each other and to the world's average results. For example, Japan is 1.13 Standard Deviations below the mean for underweight children; Bangladesh is 2.42 standard deviations *above* the mean. Averaging the three Z-scores allows us to see how much below or above the world's mean a country is, combining all three of these variables. It also takes into account both the degree of dispersion and the ranking within the data.

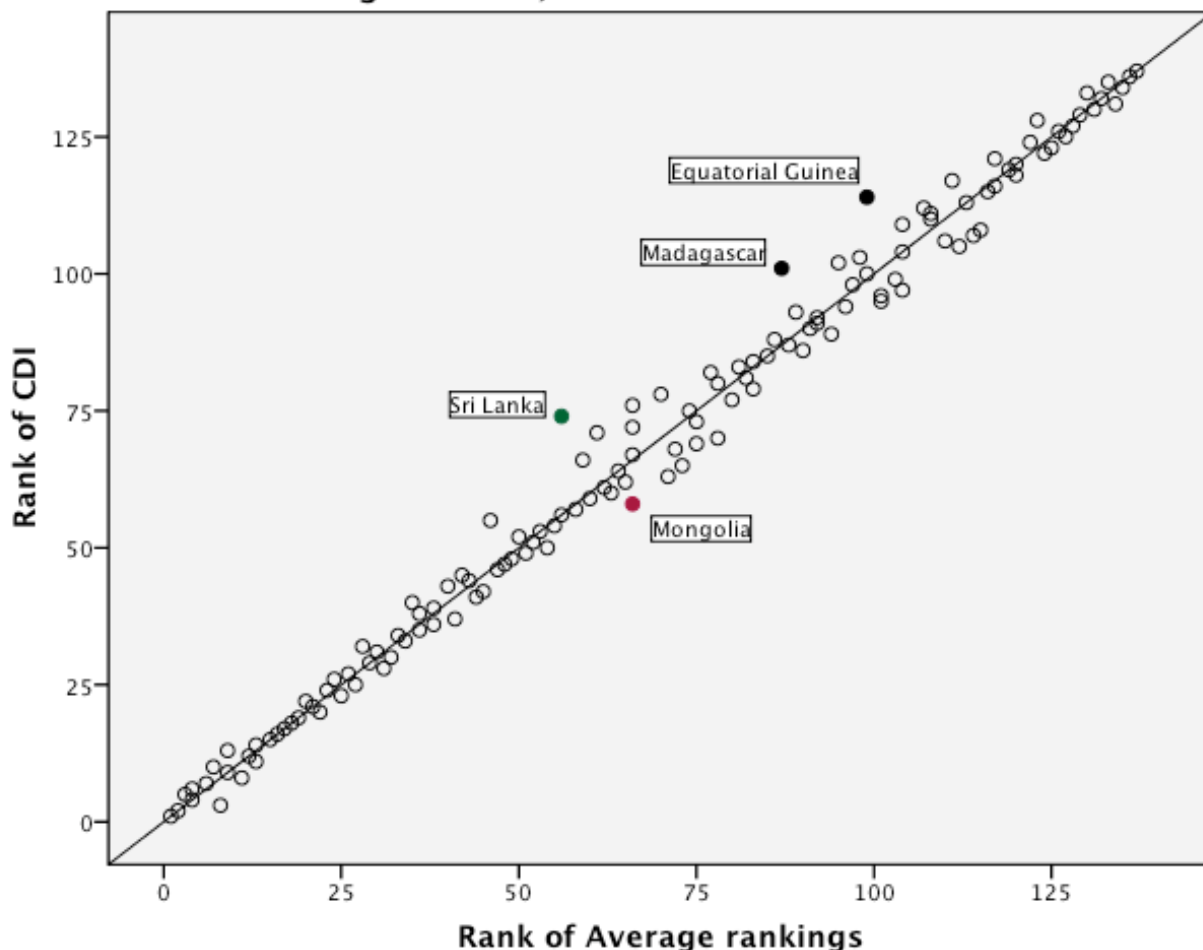
Fig. 1: Comparing countries' CDIs and their average Z scores



¹ Save the Children UK, (2008) *The Child Development Index* [online]. Available: http://www.savethechildren.org.uk/en/docs/child-development-index_data2008.xls [accessed March 25, 2009]

- By using their rankings in all three variables, averaging them and ranking them again, the relative position of a country in each ranking is given equal importance, and thus all three variables carry the same weighing. While the general trend is maintained (see graph), some countries shift by a substantial amount: Mongolia (in red) #58 in original CDI, #66 in new ranking; Sri Lanka (in green) #74 in original CDI, #56 in new ranking.

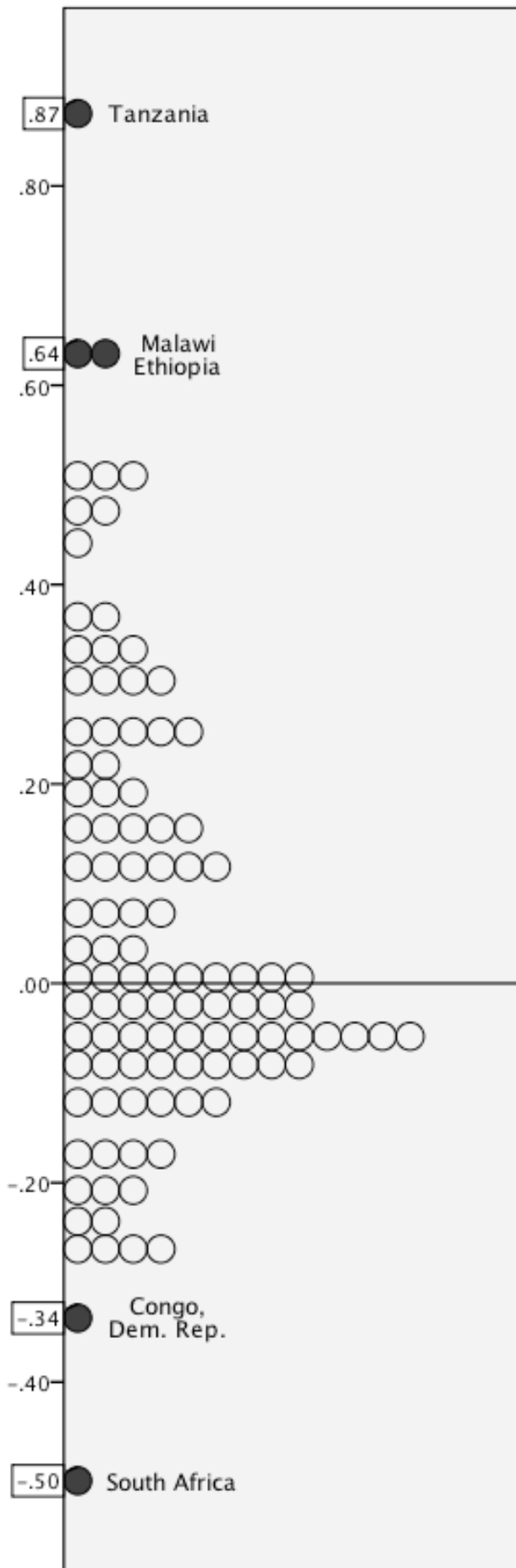
Fig. 2: Comparing countries' rankings for the CDI and their average ranking in health, education and nutrition



- By computing the Z-scores of different periods in time, we can see a country's changes in the data from one period to another, relative to the world's performance. This has been done in Fig. 3 below. For example, between the '1995-9' and the '2000-6' periods, Tanzania has had a relative improvement of 0.87 standard deviations; South Africa has seen a relative decline of 0.5 standard deviations.

- Table 1 on page 4 shows the countries' rankings for the 2000-6 period, based on a base 100 index and Z scores. 100 is equal to the world mean, and the index is obtained by subtracting the Z score, multiplied by 10 for a more comprehensive result.

Fig. 3: Changes in Z-scores from 1995-9 to 2000-6



1	Japan	110.1	51	Georgia	105.8	101	Lao PDR	93.3
2	Spain	110.1	52	Egypt, Arab Rep.	105.7	102	Madagascar	93.2
3	Canada	110.0	53	Honduras	105.4	103	Lesotho	93.1
4	Italy	109.9	54	El Salvador	105.3	104	Cameroon	92.9
5	Finland	109.9	55	Colombia	105.2	105	Bangladesh	92.7
6	Iceland	109.9	56	Mauritius	104.9	106	India	92.7
7	France	109.9	57	Mongolia	104.9	107	Zambia	92.7
8	United Kingdom	109.8	58	Moldova	104.8	108	Benin	92.7
9	Germany	109.8	59	Kyrgyz Republic	104.6	109	Equatorial Guinea	92.6
10	Norway	109.8	60	Armenia	104.5	110	Ghana	92.5
11	Netherlands	109.7	61	Suriname	104.4	111	Mauritania	91.9
12	Belgium	109.6	62	Bolivia	104.3	112	Haiti	91.8
13	Sweden	109.6	63	Lebanon	104.2	113	Gambia, The	91.8
14	Luxemburg	109.5	64	Nicaragua	104.1	114	Comoros	91.6
15	Austria	109.5	65	Saudi Arabia	104.0	115	Congo, Rep.	91.1
16	Australia	109.4	66	Kuwait	104.0	116	Mozambique	91.1
17	Denmark	109.3	67	United Arab Emirates	103.9	117	Guinea	89.9
18	Ireland	109.0	68	Trinidad and Tob	103.9	118	Cote d'Ivoire	89.7
19	Switzerland	108.6	69	West Bank and Gaza	103.6	119	Timor-Leste	89.7
20	Cuba	108.3	70	Morocco	103.5	120	Pakistan	89.0
21	Argentina	108.3	71	Iran, Islamic Re	103.4	121	Yemen, Rep.	88.8
22	Costa Rica	108.2	72	Dominican Republic	103.0	122	Ethiopia	87.5
23	United States	108.0	73	Guyana	102.6	123	Sudan	86.3
24	Chile	107.9	74	Sao Tome and Principe	102.4	124	Burundi	86.2
25	Tunisia	107.6	75	Vietnam	102.1	125	Nigeria	86.0
26	Malaysia	107.6	76	Tajikistan	102.0	126	Eritrea	85.9
27	Croatia	107.3	77	South Africa	101.7	127	Guinea-Bissau	84.2
28	Bahrain	107.3	78	Sri Lanka	101.7	128	Djibouti	83.9
29	Belarus	107.3	79	Guatemala	101.5	129	Central African	83.2
30	Russian Federation	107.3	80	Azerbaijan	101.1	130	Mali	83.0
31	Uruguay	107.3	81	Indonesia	100.5	131	Chad	82.5
32	Panama	107.2	82	Philippines	100.4	132	Congo, Dem. Rep.	82.4
33	China	107.2	83	Gabon	100.3	133	Angola	81.9
34	Qatar	107.2	84	Maldives	100.1	134	Burkina Faso	79.9
35	Romania	106.9	85	Oman	100.1	135	Somalia	77.6
36	Mexico	106.9	86	Botswana	98.1	136	Sierra Leone	77.2
37	Brazil	106.9	87	Bhutan	97.9	137	Niger	74.9
38	Paraguay	106.8	88	Malawi	97.6			
39	Belize	106.6	89	Zimbabwe	97.2			
40	Algeria	106.5	90	Namibia	96.5			
41	Thailand	106.5	91	Tanzania	96.5			
42	Peru	106.5	92	Uganda	95.8			
43	Albania	106.4	93	Myanmar	95.5			
44	Ecuador	106.3	94	Cambodia	95.3			
45	Jordan	106.2	95	Swaziland	95.0			
46	Venezuela, RB	106.2	96	Kenya	94.3			
47	Syrian Arab Rep.	106.1	97	Togo	94.3			
48	Turkey	106.1	98	Senegal	94.2			
49	Kazakhstan	105.9	99	Nepal	93.5			
50	Jamaica	105.8	100	Rwanda	93.3			

Table 1: Base 100 Index using Z scores