

DATA201 Presentation

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Is Human Development Index (HDI) a good indicator of how well countries in the world are doing socially or economically?



What is HDI?

- Summary measure of average achievement in key dimensions of human development
- For example:
 - a long and healthy life
 - being knowledgeable
 - decent standard of living



Key Dimensions of human development



The health dimension is assessed by life expectancy at birth.



The education dimension is measured by mean number of years of schooling for adults aged 25 years and more, and expected years of schooling for children of school entering age.



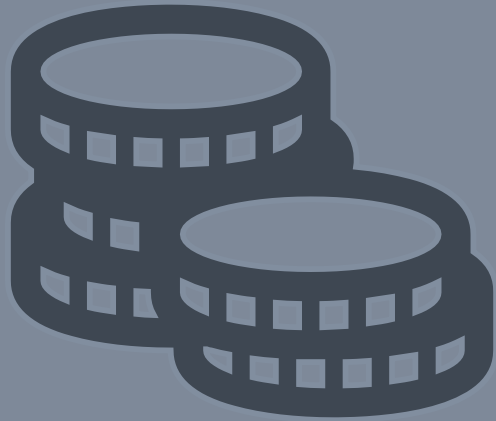
The standard of living dimension is measured by gross national income (GNI) per capita.

Reasons for our choice of topic

- Extremely relevant to societies
- Educates on the circumstances of people from all over the world
- Stimulate discussions on global, regional and local issues
- Crucial role in policy related decision making



Economic indicators



- Income Index
- Unemployment Rate
- Income Inequality
- Male vs Female labour force participation rate

Social indicators



- Suicide Rate
- Homicide Rate

Selecting Countries



It was difficult to find a meaningful way to display correlation between the HDI index for all countries in the world.

We chose to select specific countries to provide a representation of the differences between higher and lower HDI indexes.

- Group 1: Norway, Switzerland, Australia, Ireland, Germany, Iceland, Hong Kong, Sweden, Singapore, Netherlands
- Group 2: Bahamas, Uruguay, Kuwait, Malaysia, Barbados, Kazakhstan, Iran (Islamic Republic of), Palau, Seychelles, Costa Rica
- Group 3: Bolivia, Palestine, Iraq, El Salvador, Kyrgyzstan, Morocco, Nicaragua, Cabo Verde, Guyana, Guatemala
- Group 4: Mozambique, Liberia, Mali, Burkina Faso, Sierra Leone, Burundi, Chad, South Sudan, Central African Republic, Niger

Income Index



Income index is the GNI per capita expressed as an index

Raw Data for Income Index

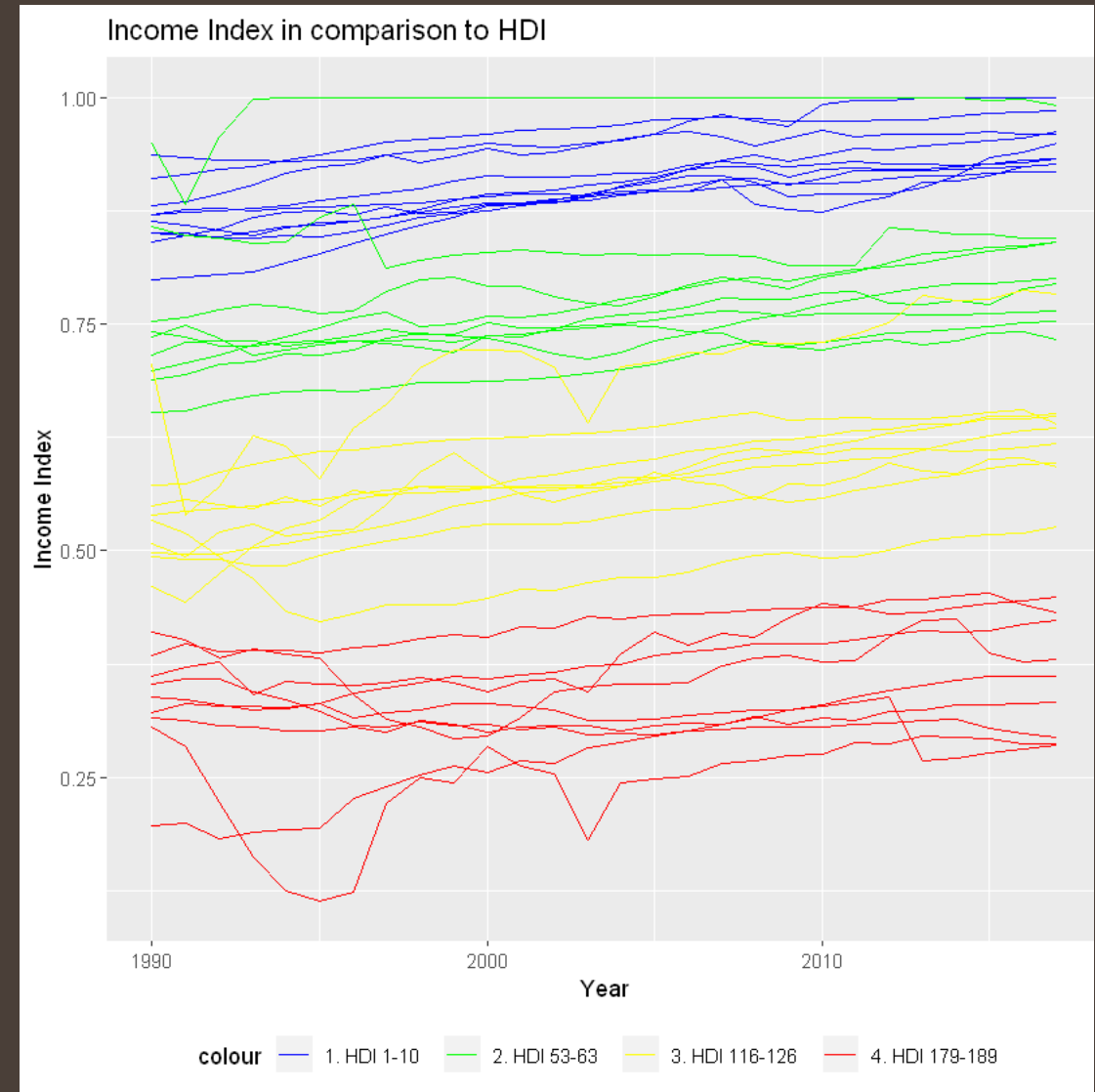
HDI	Country	1990	1991	1992	1993	1994	1995	1996	1997	...	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
168	Afghanistan	NA	NA	NA	NA	NA	NA	NA	NA	...	0.388	0.413	0.421	0.426	0.442	0.443	0.441	0.439	0.438	0.439
68	Albania	0.575	0.523	0.510	0.531	0.547	0.570	0.585	0.568	...	0.683	0.686	0.693	0.699	0.700	0.705	0.707	0.711	0.717	0.722
85	Algeria	0.694	0.686	0.686	0.681	0.676	0.677	0.680	0.680	...	0.730	0.730	0.734	0.734	0.734	0.734	0.737	0.739	0.744	0.744
35	Andorra	0.904	0.902	0.897	0.891	0.890	0.891	0.897	0.910	...	0.931	0.924	0.916	0.910	0.910	0.914	0.920	0.924	0.927	0.931
147	Angola	0.456	0.453	0.450	0.403	0.363	0.443	0.468	0.485	...	0.583	0.613	0.603	0.601	0.602	0.613	0.620	0.625	0.617	0.613
70	Antigua and Barbuda	0.755	0.762	0.762	0.769	0.775	0.764	0.770	0.776	...	0.822	0.801	0.790	0.784	0.786	0.787	0.792	0.797	0.803	0.806

Wrangled Data

Country	Year	Factor
Norway	1990	0.911
Switzerland	1990	0.936
Australia	1990	0.850
Ireland	1990	0.799
Germany	1990	0.870
Iceland	1990	0.850

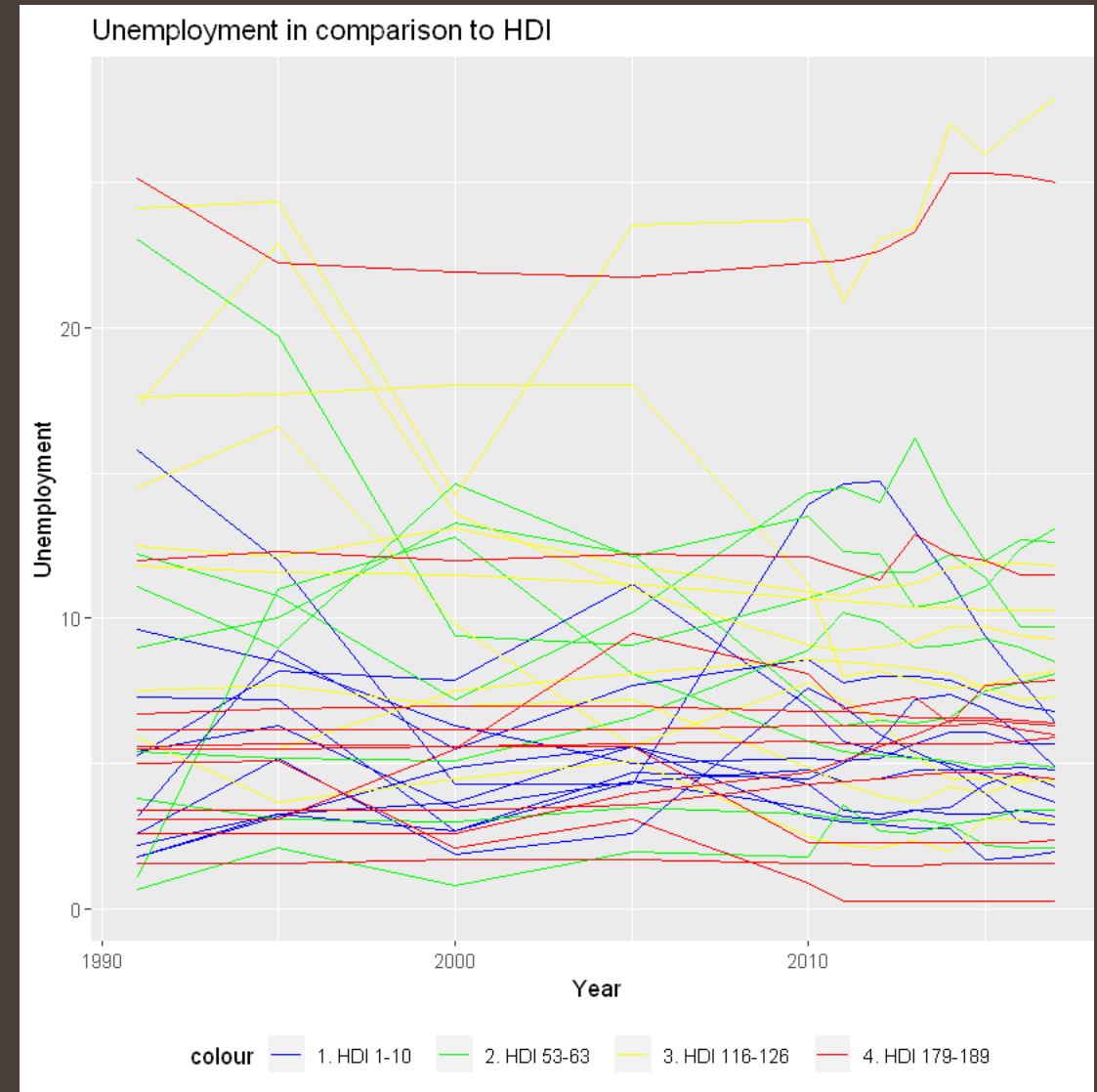
Income Index (grouped by HDI)

- Visible correlation between the Income Index and the HDI
- Income Index appears to generally linearly increase over time, which is expected as GNI increases
- The countries in the lowest HDI bracket appear to not have as much as an increase in growth as the more developed countries.



Unemployment rates (grouped by HDI)

- Percentage of the labour force population ages 15 and older that is not in employment but is available for work
- This generated a plot that didn't show a clear pattern between the groups.



IMF Unemployment Data

Projections of economic developments
at the global level.

Medium-term projections are available
for selected indicators, such as
unemployment.

Raw Data from IMF website

								Shaded cells indicate IMF staff estimates				
Country	Subject Descriptor	Units	Scale	Country/Series-specific Notes	2017	2018	2019	2020	2021	2022	2023	2024
Australia	Unemployment rate	Percent of total labor force		f	5.583	5.292	4.793	4.792	4.792	4.788	4.795	4.790
The Bahamas	Unemployment rate	Percent of total labor force		f	10.100	9.200	9.046	9.028	8.914	8.820	8.725	8.628
Barbados	Unemployment rate	Percent of total labor force		f	9.880	10.118	10.425	10.506	10.295	9.976	9.656	9.337
Bolivia	Unemployment rate	Percent of total labor force		f	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Burkina Faso	Unemployment rate	Percent of total labor force										
Burundi	Unemployment rate	Percent of total labor force										
Cabo Verde	Unemployment rate	Percent of total labor force		f	9.000	8.500	8.500	8.500	8.500	8.500	8.500	8.500
Central African Republic	Unemployment rate	Percent of total labor force										
Chad	Unemployment rate	Percent of total labor force										
Costa Rica	Unemployment rate	Percent of total labor force		f	9.293	10.200	9.659	9.600	9.600	9.500	9.300	9.300
El Salvador	Unemployment rate	Percent of total labor force		f	6.800	6.685	6.702	6.802	6.852	6.852	6.852	6.852
Germany	Unemployment rate	Percent of total labor force		f	3.758	3.392	3.391	3.315	3.276	3.244	3.205	3.149

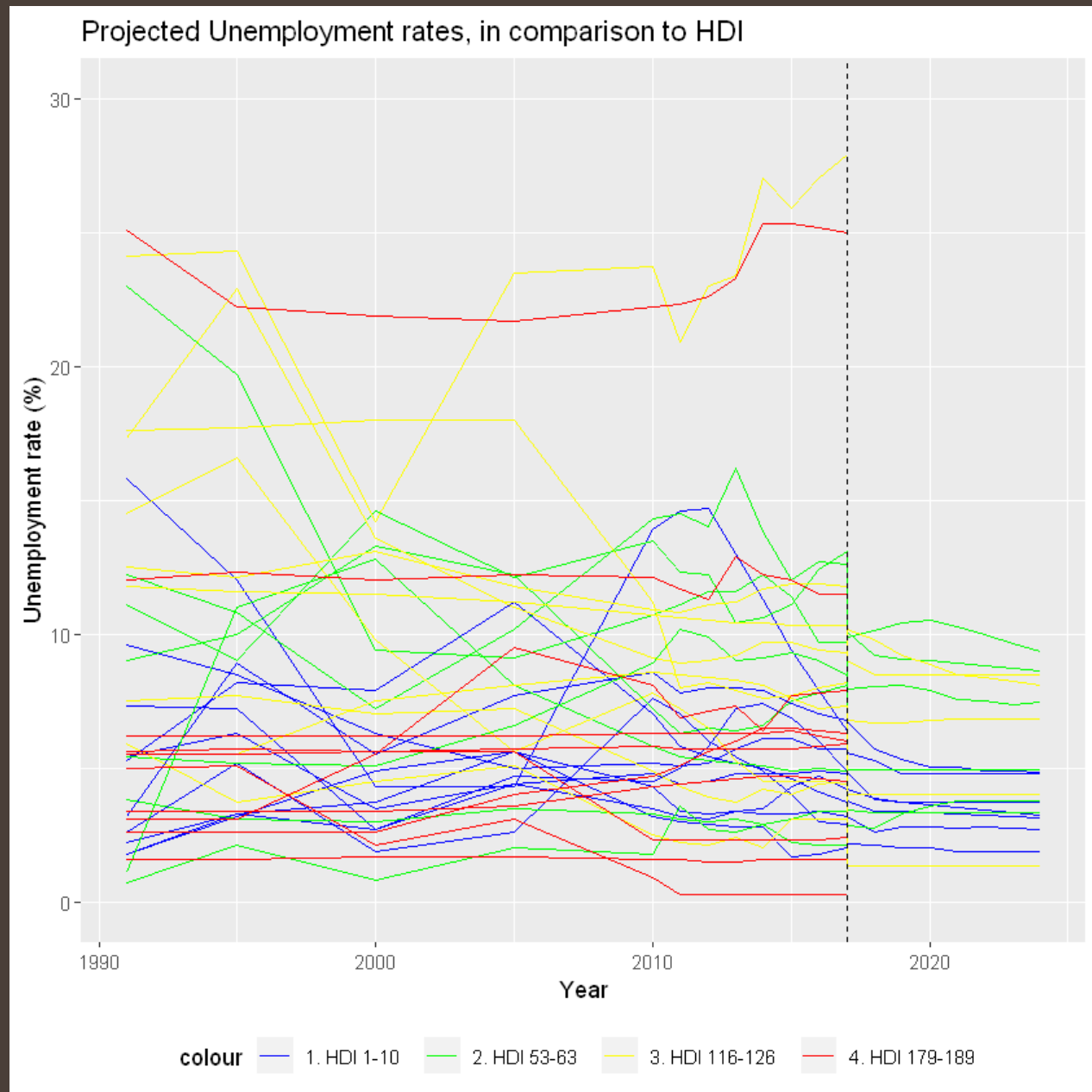
Scraped and Wrangled Data

	Country	Subject Descriptor	Units	2017	2018	2019	2020	2021	2022	2023	2024
5	Barbados	Unemployment rate	Percent of total labor force	9.880	10.118	10.425	10.506	10.295	9.976	9.656	9.337
6	Bolivia	Unemployment rate	Percent of total labor force	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
7	Burkina Faso	Unemployment rate	Percent of total labor force								
8	Burundi	Unemployment rate	Percent of total labor force								
9	Cabo Verde	Unemployment rate	Percent of total labor force	9.000	8.500	8.500	8.500	8.500	8.500	8.500	8.500
10	Central African Republic	Unemployment rate	Percent of total labor force								

	Country	HDI	2017	2018	2019	2020	2021	2022	2023	2024
1	Norway	1	4.216	3.854	3.700	3.700	3.700	3.700	3.700	3.700
2	Switzerland	2	3.186	2.628	2.819	2.793	2.760	2.779	2.746	2.714
3	Australia	3	5.583	5.292	4.793	4.792	4.792	4.788	4.795	4.790
4	Ireland	4	6.725	5.692	5.335	5.041	5.011	4.866	4.884	4.853
7	Hong Kong, China (SAR)	7	3.758	3.392	3.391	3.315	3.276	3.244	3.205	3.149
9	Singapore	9	2.175	2.125	2.000	2.000	1.900	1.900	1.900	1.900
10	Netherlands	10	4.854	3.839	3.739	3.639	3.539	3.439	3.339	3.239

Country	Year	Value
Barbados	2017	9.880
Bolivia	2017	4.000
Cabo Verde	2017	9.000
Costa Rica	2017	9.293
El Salvador	2017	6.800
Germany	2017	3.758
Hong Kong SAR	2017	3.119
Iceland	2017	2.825

Unemployment and IMF Projected Unemployment



Male vs Female labour force participation rates

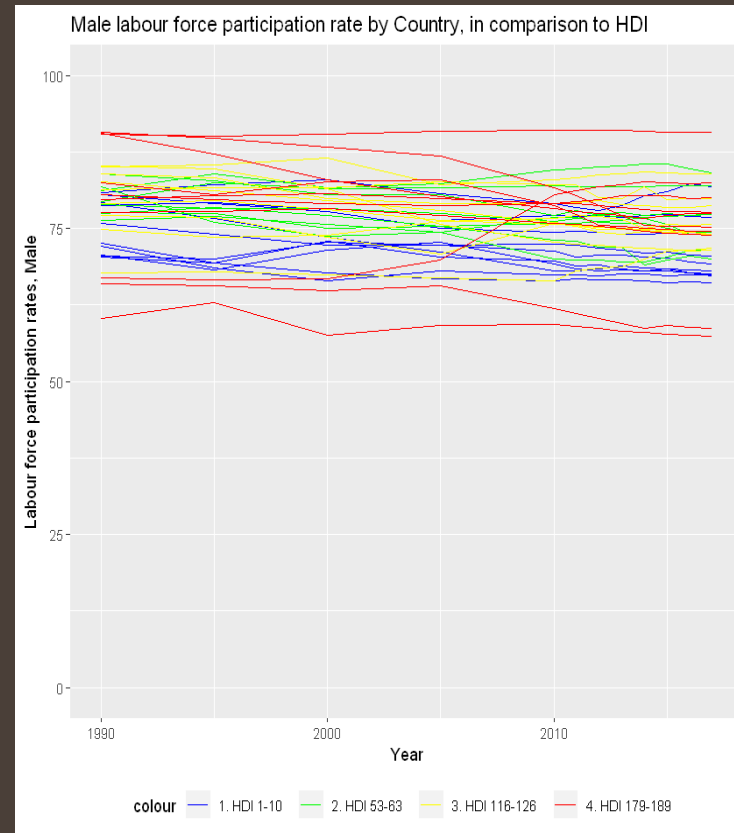


There is not a visible correlation between HDI and each genders workforce participation rate here.

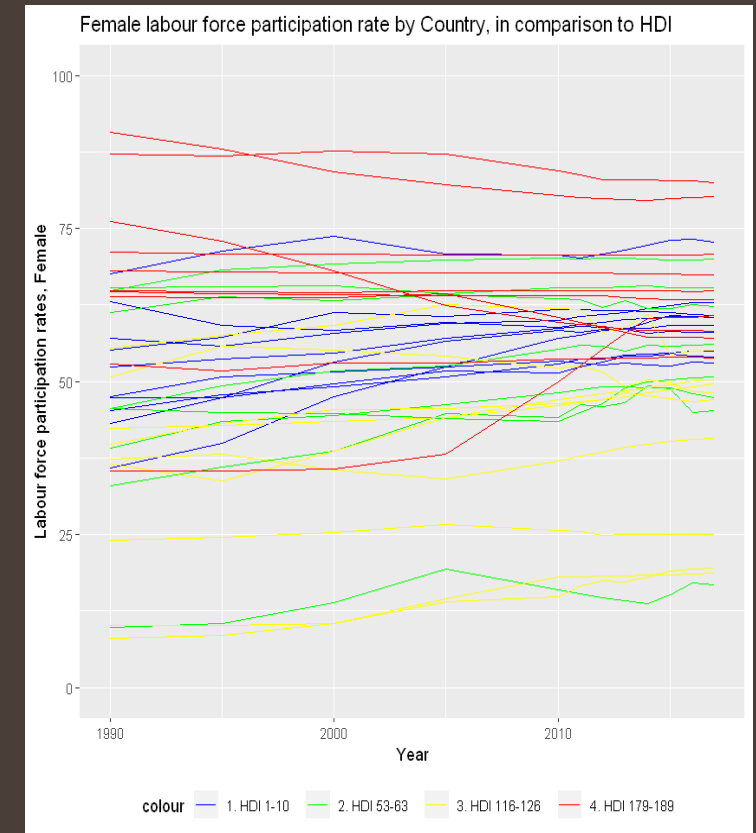
The overall trend is lower female workplace participation rates in many countries.



Male labour force participation



Female labour force participation



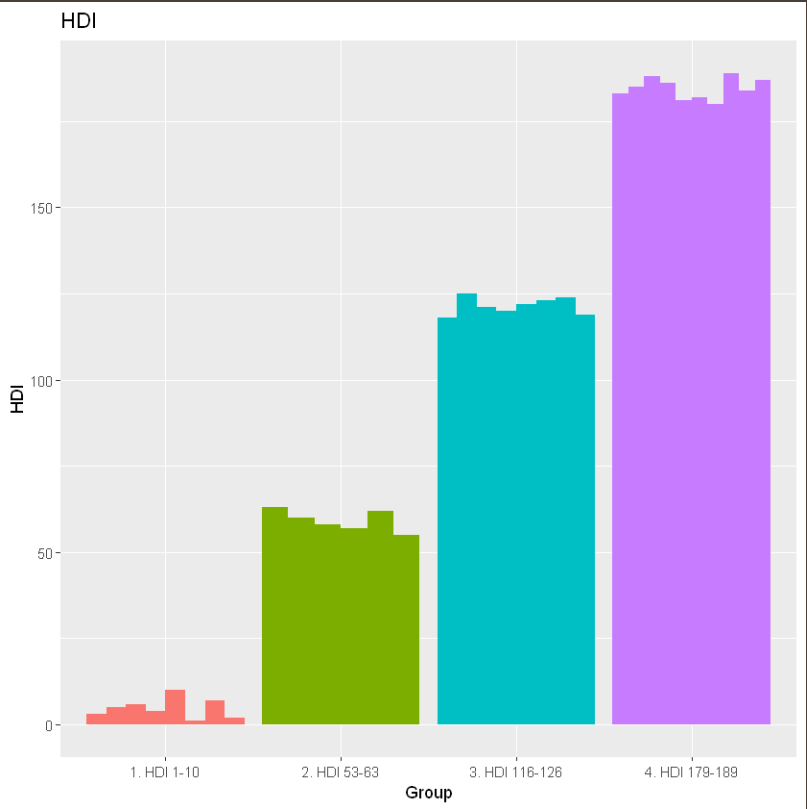
Income Inequality (grouped by HDI)

Income inequality is the measure of the deviation of the distribution of income among individuals within a country from an equal distribution.

Our graph for income inequality is a bar graph that shows a minor correlation between countries that are considered more developed and having less inequality.

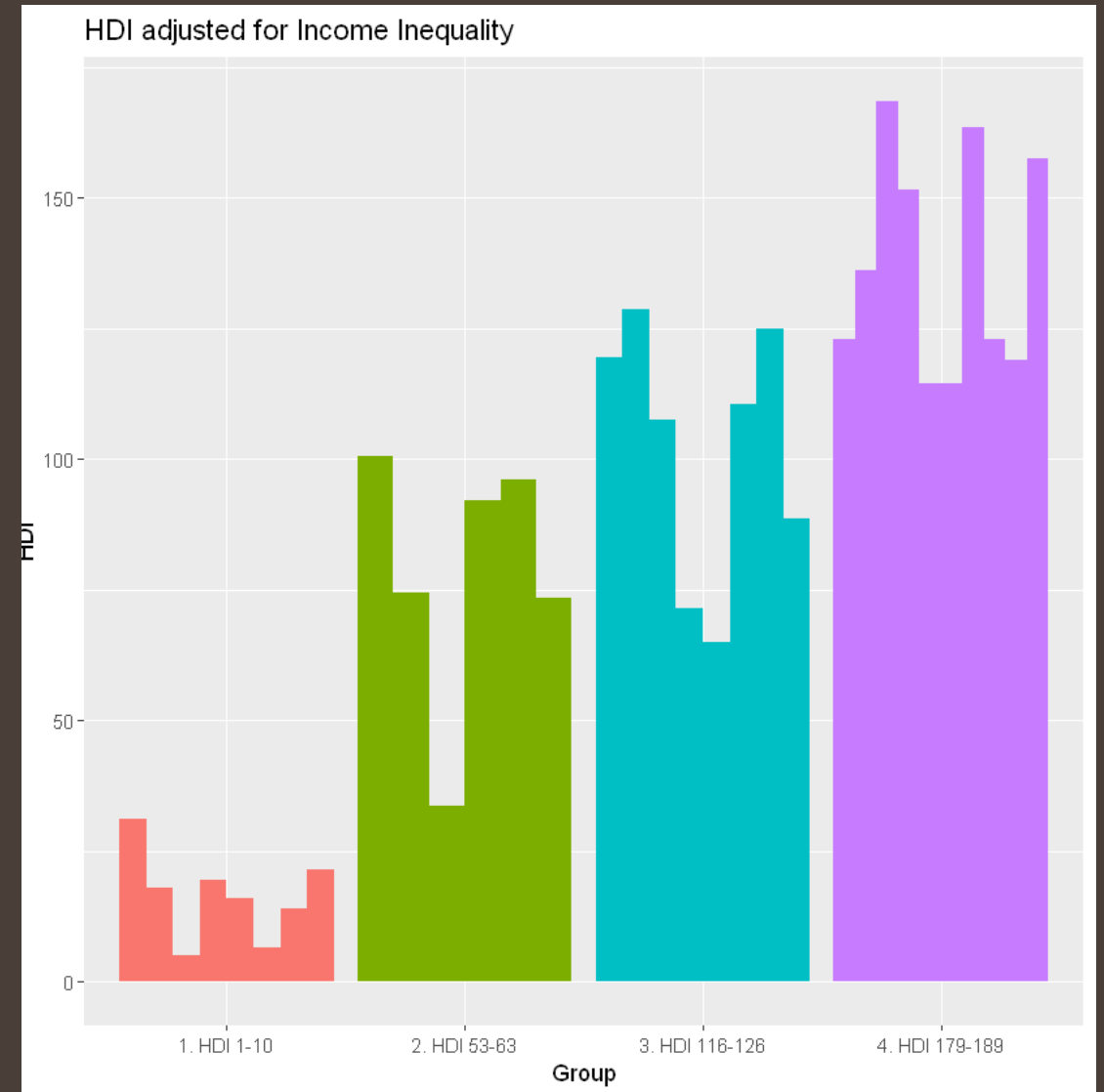


HDI by group



HDI adjusted for Income Inequality

- We chose to attempt to alter the HDI index for these 40 countries to consider the inequality index.
- We ranked each country based on income inequality
- Took the average of the HDI and inequality index to show an example of what HDI might look like if it had been adjusted for income inequality.



Suicide rate

Raw data of suicide rate in male and female (2010-2015)

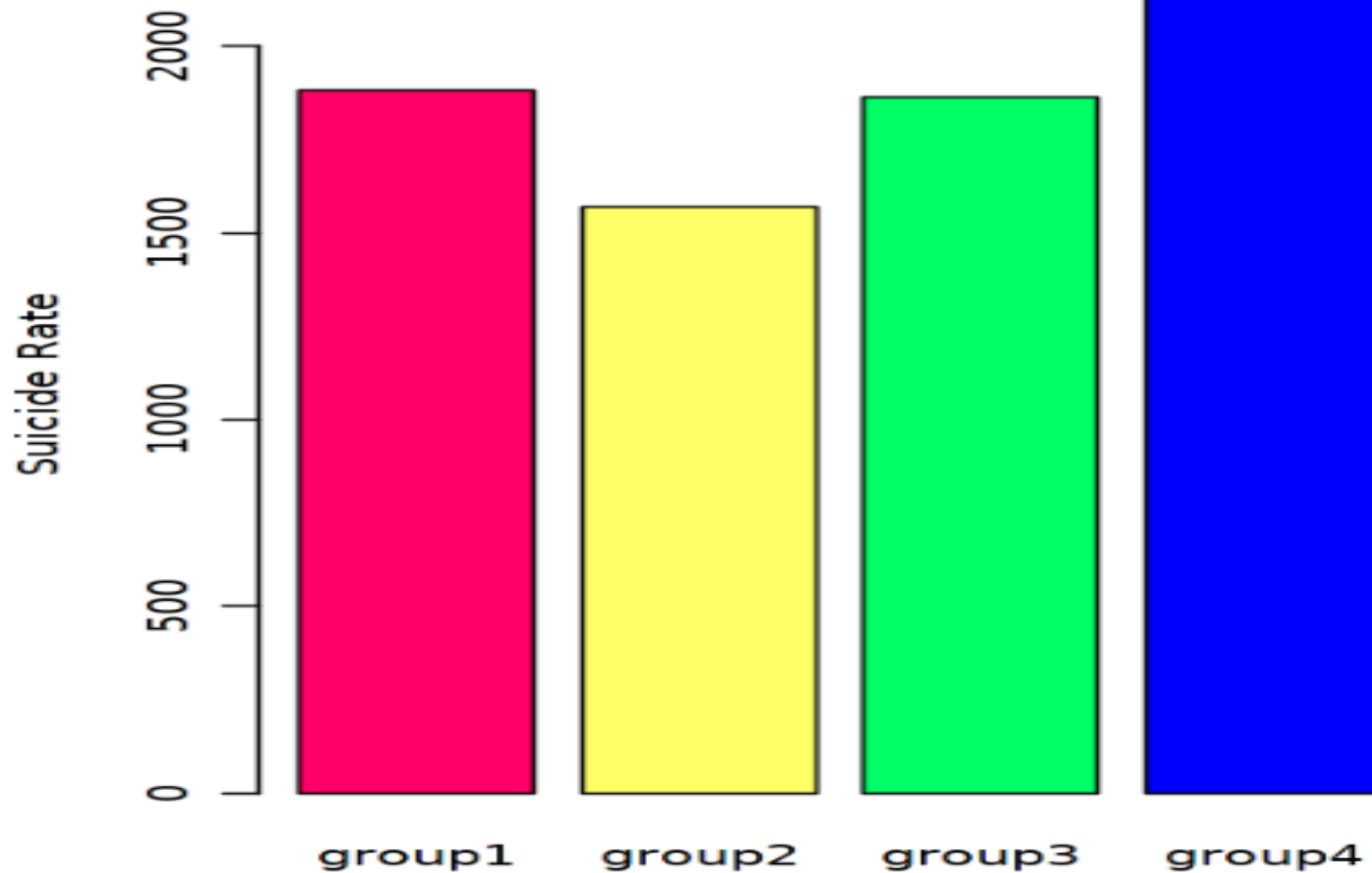
A spec_tbl_df: 181 x 10									
HDI Rank	Country	2000	X4	2005	X6	2010	X8	2015	X10
<dbl>	<chr>	<dbl>	<chr>	<dbl>	<chr>	<dbl>	<chr>	<dbl>	<chr>
168	Afghanistan	10.9	..	11.7	..	11.1	..	10.9	..
68	Albania	9.8	..	9.5	..	7.3	..	5.3	..
85	Algeria	4.8	..	5.4	..	5.3	..	5.0	..
147	Angola	36.3	..	38.5	..	38.8	..	38.1	..
70	Antigua and Barbuda	4.6	..	3.2	..	0.4	..	0.0	..
47	Argentina	22.8	..	20.5	..	21.4	..	23.7	..
83	Armenia	6.7	..	7.3	..	7.3	..	7.3	..
3	Australia	20.0	..	16.8	..	16.8	..	16.8	..
20	Austria	24.9	..	21.1	..	21.1	..	21.1	..
80	Azerbaijan	4.8	..	6.0	..	6.0	..	6.0	..
54	Bahamas	2.5	..	1.1	..	1.1	..	1.1	..
43	Bahrain	9.0	..	10.2	..	10.2	..	10.2	..
136	Bangladesh	6.6	..	5.2	..	5.2	..	5.2	..
58	Barbados	3.3	..	3.7	..	3.7	..	3.7	..
53	Belarus	68.7	..	56.0	..	56.0	..	56.0	..
17	Belgium	28.2	..	24.8	..	24.8	..	24.8	..
106	Belize	16.5	..	11.2	..	11.2	..	11.2	..
163	Benin	21.8	..	22.9	..	22.9	..	22.9	..
134	Bhutan	20.0	..	17.2	..	14.5	..	13.9	..
118	Bolivia (Plurinational State of)	36.7	..	32.6	..	29.7	..	26.7	..
77	Bosnia and Herzegovina	14.7	..	11.1	..	7.5	..	7.1	..
101	Botswana	23.9	..	23.2	..	20.7	..	19.5	..
79	Brazil	9.5	..	10.1	..	9.4	..	9.6	..
39	Brunei Darussalam	1.3	..	2.4	..	0.9	..	1.4	..
51	Bulgaria	24.4	..	19.9	..	18.0	..	18.3	..
183	Burkina Faso	25.9	..	25.0	..	24.9	..	25.1	..
185	Burundi	20.3	..	21.7	..	21.5	..	20.3	..
125	Cabo Verde	22.6	..	18.7	..	18.8	..	18.5	..

A spec_tbl_df: 181 x 10									
HDI Rank (2017)	Country	2000	X4	2005	X6	2010	X8	2015	X10
<dbl>	<chr>	<dbl>	<chr>	<dbl>	<chr>	<dbl>	<chr>	<dbl>	<chr>
168	Afghanistan	2.3	..	2.6	..	2.8	..	3.1	..
68	Albania	3.1	..	3.6	..	2.8	..	2.4	..
85	Algeria	2.3	..	2.1	..	1.4	..	1.3	..
147	Angola	12.0	..	13.3	..	14.3	..	14.3	..
70	Antigua and Barbuda	0.1	..	0.0	..	0.0	..	0.0	..
47	Argentina	5.0	..	4.5	..	4.6	..	4.8	..
83	Armenia	1.7	..	1.5	..	1.8	..	1.8	..
3	Australia	5.2	..	4.9	..	5.1	..	5.6	..
20	Austria	7.8	..	6.3	..	5.4	..	5.3	..
80	Azerbaijan	1.0	..	1.4	..	1.3	..	1.1	..
54	Bahamas	1.0	..	0.2	..	1.2	..	0.4	..
43	Bahrain	3.5	..	3.4	..	3.1	..	2.9	..
136	Bangladesh	8.6	..	9.2	..	8.3	..	6.6	..
58	Barbados	0.6	..	0.3	..	0.3	..	0.1	..
53	Belarus	10.1	..	9.5	..	7.2	..	5.4	..
17	Belgium	10.4	..	8.7	..	9.1	..	9.1	..
106	Belize	2.5	..	1.3	..	2.4	..	2.0	..
163	Benin	7.9	..	8.2	..	8.3	..	8.4	..
134	Bhutan	13.7	..	11.7	..	10.5	..	9.9	..
118	Bolivia (Plurinational State of)	19.2	..	18.5	..	16.4	..	14.4	..
77	Bosnia and Herzegovina	3.5	..	2.6	..	2.0	..	1.9	..
101	Botswana	7.7	..	7.7	..	6.9	..	6.2	..
79	Brazil	2.2	..	2.6	..	2.7	..	2.7	..
39	Brunei Darussalam	0.9	..	1.1	..	0.3	..	1.3	..
51	Bulgaria	7.8	..	5.6	..	4.9	..	4.8	..
183	Burkina Faso	8.5	..	8.8	..	9.4	..	10.1	..
185	Burundi	6.2	..	6.9	..	7.0	..	6.3	..
125	Cabo Verde	8.9	..	7.8	..	7.9	..	7.0	..

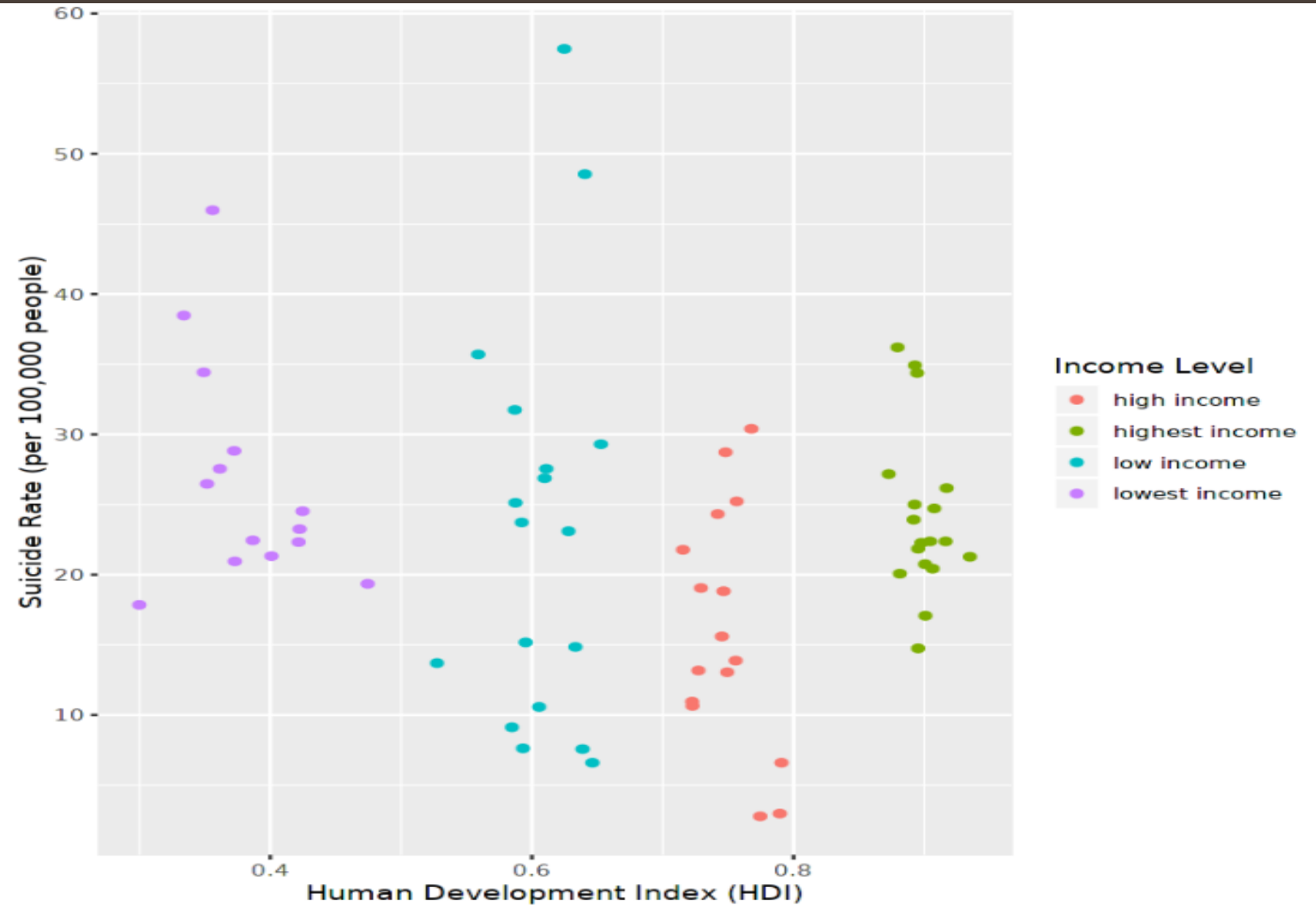
Category	Suicide Rate	HDI
<chr>	<dbl>	<chr>
group1	1882.5	HDI Rank 1-22
group2	1567.9	HDI Rank 53-74
group3	1863.4	HDI Rank 116-136
group4	2210.9	HDI Rank 170-189

Suicide rate (grouped by HDI)

- HDI Rank 1-22
- HDI Rank 53-74
- HDI Rank 116-136
- HDI Rank 170-189



Relation
between
HDI (20
countries per
group) and
suicide rate



Homicide Rate

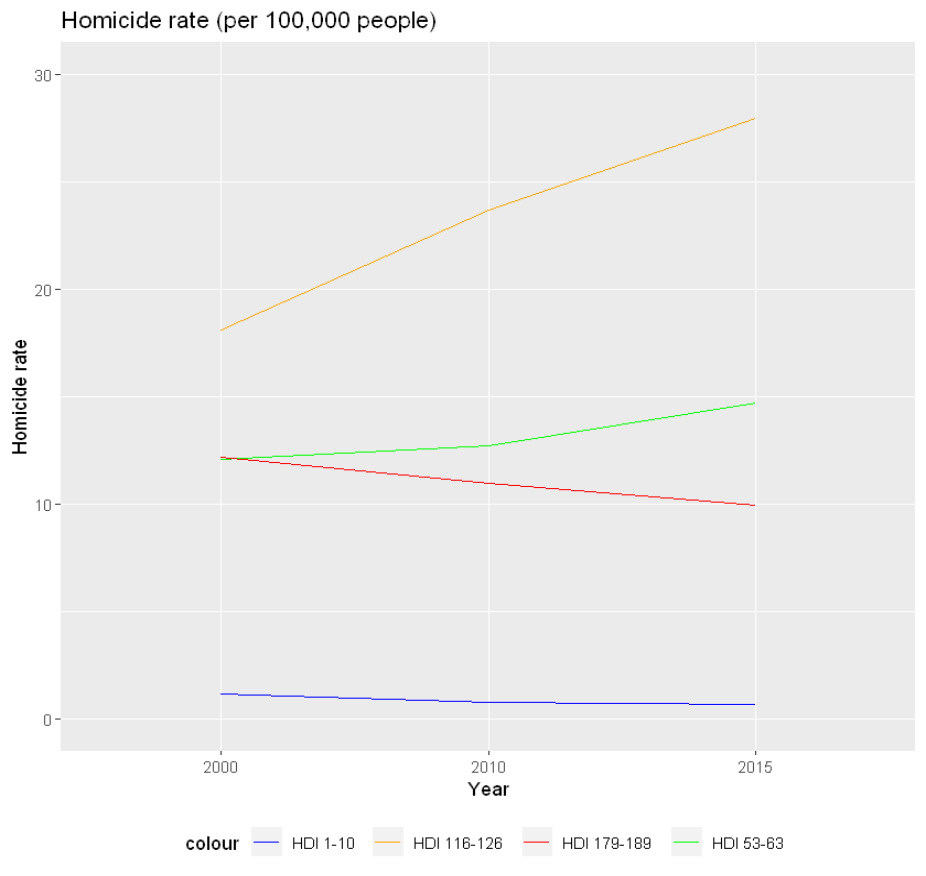
Raw data of Homicide Rate(2000-2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
	HDI Rank (Country		2000		2005		2010		2011		2012		2013		2014		2015		2016	
2	168 Afghanistan ..	..	..	..	..	..	3.4 ..	..	4.1 ..	..	6.3 ..	..	..	..	..	..	..	..	..	..
3	68 Albania	4.2 ..	..	..	5 ..	..	4.3 ..	..	4.9 ..	..	5.4 ..	..	4.2 ..	..	4 ..	..	2.3 ..	..	2.7 ..	..
4	85 Algeria	..	..	..	0.6 ..	..	0.7 ..	..	0.8 ..	..	1.4 ..	..	1.3 ..	..	1.5 ..	..	1.4 ..	..	..	..
5	35 Andorra	..	..	..	..	..	..	..	1.2 ..	..	..	..	..	..	..	..	..	..	..	..
6	147 Angola	..	..	..	..	..	..	..	4.4 ..	..	4.8 ..	..	..	..	..	..	..	..	..	..
7	70 Antigua ar	6 ..	..	..	3.4 ..	..	6.3 ..	..	..	..	10.3 ..	..	..	..	..	..	..	..	..	..
8	47 Argentina	..	..	..	..	..	..	..	..	..	..	..	..	..	7.5 ..	..	6.5 ..	..	5.9 ..	..
9	83 Armenia	3 ..	..	..	1.9 ..	..	1.9 ..	..	2.5 ..	..	2.3 ..	..	2.2 ..	..	2.5 ..	..	2.6 ..	..	3 ..	..
10	3 Australia	1.9 ..	..	..	1.3 ..	..	1 ..	..	1.1 ..	..	1.1 ..	..	1.1 ..	..	1 ..	..	1 ..	..	0.9 ..	..
11	20 Austria	1 ..	..	..	0.7 ..	..	0.7 ..	..	0.9 ..	..	0.9 ..	..	0.7 ..	..	0.5 ..	..	0.5 ..	..	0.7 ..	..
12	80 Azerbaijan	2.8 ..	..	..	2.2 ..	..	2.3 ..	..	..	..	2.2 ..	..	2.4 ..	..	2.5 ..	..	..	..	2.1 ..	..
13	54 Bahamas	24.8 ..	..	..	15.8 ..	..	26.1 ..	..	34.6 ..	..	29.8 ..	..	31.5 ..	..	32.2 ..	..	37.7 ..	..	28.4 ..	..
14	43 Bahrain	..	..	..	0.5 ..	..	0.9 ..	..	0.5 ..	..	0.3 ..	..	0.4 ..	..	0.5 ..	..	..	..	..	..
15	136 Bangladesh	2.5 ..	..	..	2.5 ..	..	2.6 ..	..	2.6 ..	..	2.6 ..	..	2.8 ..	..	2.8 ..	..	2.5 ..	..	..	..
16	58 Barbados	7.4 ..	..	..	10.6 ..	..	11.1 ..	..	9.6 ..	..	7.8 ..	..	8.5 ..	..	8.8 ..	..	10.9 ..	..	..	..
17	53 Belarus	10.2 ..	..	..	8.6 ..	..	4.2 ..	..	3.9 ..	..	3.6 ..	..	3.5 ..	..	3.6 ..	..	..	..	..	..
18	17 Belgium	2.1 a	..	..	2.1 a	..	1.7 a	..	1.9 a	..	1.9 a	..	1.8 a	..	1.9 a	..	1.9 a	..	..	..
19	106 Belize	16.6 ..	..	..	28.6 ..	..	40.1 ..	..	37.7 ..	..	43.1 ..	..	28.8 ..	..	35 ..	..	33.1 ..	..	37.6 ..	..
20	163 Benin	7.3 ..	..	..	7.2 ..	..	6.6 ..	..	..	..	..	..	..	..	..	..	6.2 ..	..	..	..
21	134 Bhutan	3.1 ..	..	..	1.7 ..	..	2.2 ..	..	4.3 ..	..	4.4 ..	..	3.1 ..	..	..	..	1.5 ..	..	1.1 ..	..
22	118 Bolivia (Pl...	..	..	..	5.2 ..	..	12.8 ..	..	12.3 ..	..	11.9 ..	..	9 ..	..	8.9 ..	..	6.3 ..	..	6.3 ..	..
23	77 Bosnia and	2.6 ..	..	..	1.9 ..	..	1.5 ..	..	1.4 ..	..	1.7 ..	..	1.3 ..	..	1.4 ..	..	1.6 ..	..	1.3 ..	..
24	101 Botswana	..	..	..	15.7 ..	..	15 ..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	79 Brazil	23.7 ..	..	..	23.4 ..	..	22 ..	..	24.2 ..	..	26.5 ..	..	26.8 ..	..	28 ..	..	28.4 ..	..	29.5 ..	..

Wrangled Data

A data.frame: 3 × 2	
year	Homicide_rate
<chr>	<dbl>
2000	1.17
2010	0.78
2015	0.68

Homicide rate (grouped by average HDI)



159	Mauritania	13.7	12.4	10.9	..	..	..	..	9.9	..
161	Madagascar	11.4	10.0	9.2	..	..	..	..	7.7	..
162	Uganda	..	8.7	9.3	10.7	11.2	10.3	11.5	..	..
163	Benin	7.3	7.2	6.6	..	..	..	..	6.2	..
164	Senegal	10.0	9.3	8.5	..	..	..	..	7.4	..
165	Comoros	10.4	9.5	8.5	..	..	..	..	7.7	..
165	Togo	10.5	10.7	9.6	..	..	..	..	9.0	..
167	Sudan	..	..	..	..	..	..	..	..	..
168	Afghanistan	..	..	3.4	4.1	6.3	..	..	..	..
168	Haiti	..	..	6.8	9.0	10.0	..	..	..	..
170	Cote d'Ivoire	16.1	14.7	12.6	..	..	..	..	11.6	..
171	Malawi	6.2	1.5	3.4	2.2	1.7	..	..	..	..
172	Djibouti	8.9	8.1	7.4	..	..	..	..	6.5	..
173	Ethiopia	10.7	9.4	8.5	..	..	..	..	7.6	..
174	Gambia	12.4	9.8	9.8	..	..	..	..	9.1	..
175	Guinea	10.9	10.1	9.4	..	..	..	..	8.8	..
176	Congo (Democratic Republic of the)	14.1	14.7	14.3	..	..	..	..	13.5	..
177	Guinea-Bissau	13.0	11.7	10.5	..	..	..	..	9.6	..

Conclusion

Is HDI a good indicator of how well countries in the world are doing socially or economically?

Advantage: Useful indicator in many contexts

Disadvantage: Only focuses on certain aspects of development (with some of our graphs having little to no correlation with HDI)

Researchers must keep in mind it has a **limited range** and it cannot provide a complete view of human development

A more useful measure would be a **combination of HDI and other useful indicators** to get a more accurate view

Questions

