WDI Indicators (2022) — Exploratory Analysis

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1 Overview

This report explores a subset of World Development Indicators (WDI) across countries in 2022. We focus on the relationships among economic development (GDP per capita), health outcomes (life expectancy), and other social indicators such as unemployment, inflation, and inequality.

2 Load data

	country	inflation_rate	exports_gdp_share	gdp_growth_rate	gdp_per_capita	adult_lite
0	Afghanistan	13.712102	18.380042	-6.240172	357.261153	NaN
1	Albania	6.725203	37.197076	4.826801	7756.961887	NaN
2	Algeria	9.265516	30.791556	3.600000	4960.303343	NaN
3	American Samoa	NaN	46.957520	1.735016	18017.458938	NaN
4	Andorra	NaN	NaN	9.564612	42414.047986	NaN

3 Data quality checks

We first check the dataset size, column types, and missingness.

```
(217, 14)
```

```
country                          str
inflation_rate               float64
exports_gdp_share            float64
gdp_growth_rate              float64
gdp_per_capita               float64
adult_literacy_rate          float64
primary_school_enrolment_rate float64
education_expenditure_gdp_share float64
measles_immunisation_rate    float64
health_expenditure_gdp_share float64
income_inequality            float64
unemployment_rate            float64
life_expectancy              float64
total_population             float64
dtype: object
```

```
adult_literacy_rate              0.792627
income_inequality                0.682028
primary_school_enrolment_rate    0.253456
education_expenditure_gdp_share  0.248848
inflation_rate                   0.179724
exports_gdp_share                0.161290
unemployment_rate                0.142857
health_expenditure_gdp_share     0.115207
```

```
measles_immunisation_rate        0.110599
gdp_growth_rate                  0.036866
gdp_per_capita                   0.036866
country                          0.000000
life_expectancy                  0.000000
total_population                 0.000000
dtype: float64
```

4 Exploratory data analysis (3+ indicators)

In this section, we summarize key indicators and inspect distributions.

4.1 Summary statistics

	life_expectancy	gdp_per_capita	total_population	unemployment_rate	inflation_rate	income
count	217.000000	209.000000	2.170000e+02	186.000000	178.000000	69.0000
mean	73.108020	21142.747417	3.671133e+07	7.196930	12.645329	35.201
std	7.942539	31040.300784	1.415279e+08	5.845956	19.752353	6.8839
min	18.818000	302.992505	9.992000e+03	0.130000	-6.687321	24.100
25%	67.788000	2899.160475	8.216370e+05	3.484750	5.361652	30.900
50%	74.160976	7655.594210	6.664449e+06	5.337000	7.985187	33.900
75%	78.531000	28360.304147	2.601872e+07	9.194500	12.259876	38.800
max	85.746000	226052.001905	1.425423e+09	36.472000	171.205491	54.800

4.2 Correlations (numeric indicators)

	life_expectancy	gdp_per_capita	total_population	unemployment_rate	inflation
life_expectancy	1.000000	0.570982	-0.005244	-0.115117	-0.05678
gdp_per_capita	0.570982	1.000000	-0.070115	-0.200769	-0.16351
total_population	-0.005244	-0.070115	1.000000	-0.081104	-0.02716
unemployment_rate	-0.115117	-0.200769	-0.081104	1.000000	0.059381
inflation_rate	-0.056786	-0.163516	-0.027161	0.059381	1.000000
income_inequality	-0.249699	-0.263553	-0.045055	0.154770	0.068290

5 Relationship between life expectancy and GDP per capita

We expect countries with higher GDP per capita to generally have higher life expectancy, though the relationship may flatten at high income levels.
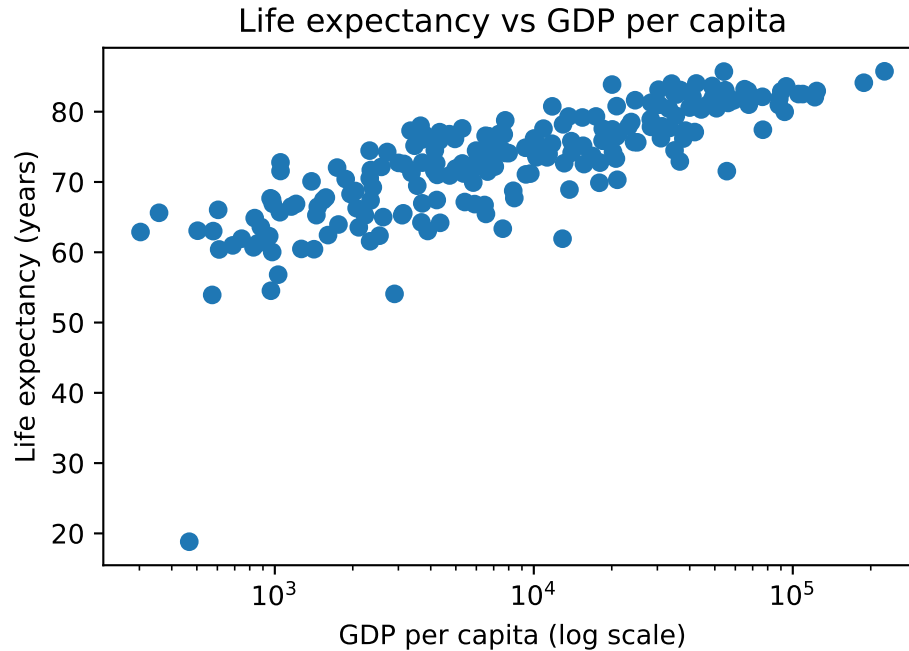

Figure 1: Life expectancy vs GDP per capita (log scale).

As shown in Figure 1, life expectancy tends to increase as GDP per capita increases. The income–life expectancy pattern is consistent with the classic "Preston curve" relationship (Preston 1975).

6 Inequality and life expectancy

Next we examine whether countries with higher income inequality tend to have lower life expectancy.

Figure Figure 2 suggests that there isn't a significant association between life expectancy and income inequality. It may be slightly negative but more tests are needed and may not be significant.
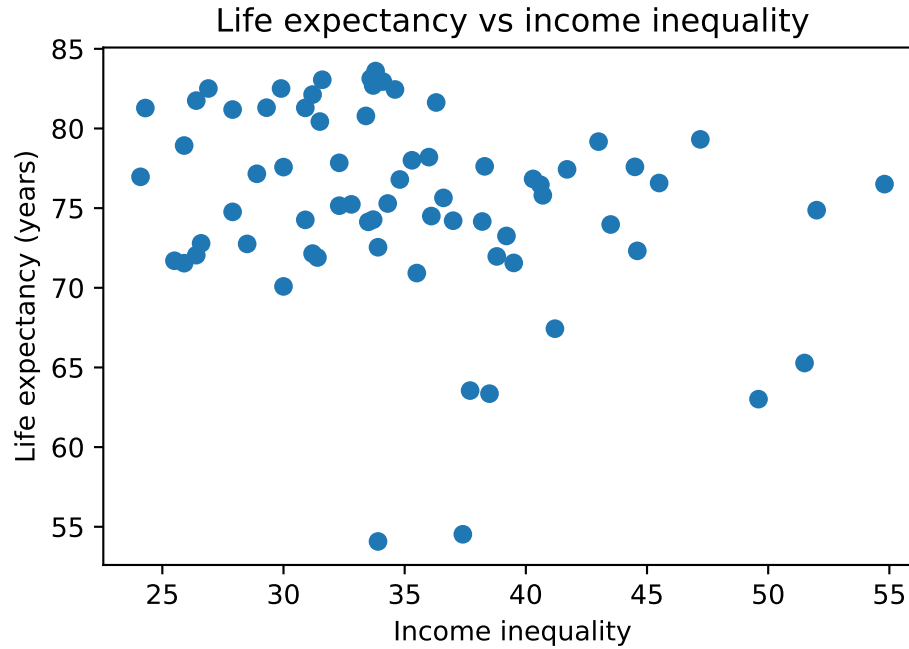
Figure 2: Life expectancy vs income inequality.

7 Top countries by life expectancy

Figure Figure 3 highlights the highest life expectancy values in the dataset. The top 15 are all above 80 and with countries distributed from Asia, Europe, Oceania, and small island nations.

8 Summary table

We summarize central tendencies and ranges for selected indicators.

Table 4: Summary statistics for selected indicators.

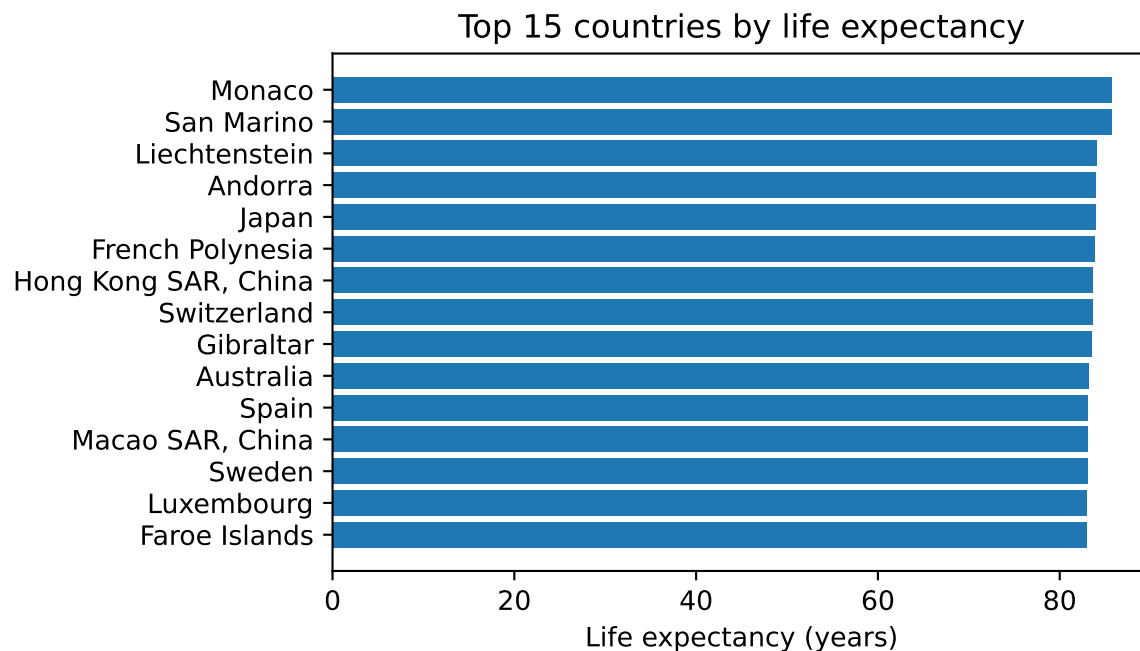|	count	mean	median	min	max
life_expectancy	217.0	7.310802e+01	7.416098e+01	18.818000	8.574600e+01
gdp_per_capita	209.0	2.114275e+04	7.655594e+03	302.992505	2.260520e+05
total_population	217.0	3.671133e+07	6.664449e+06	9992.000000	1.425423e+09
unemployment_rate	186.0	7.196930e+00	5.337000e+00	0.130000	3.647200e+01
inflation_rate	178.0	1.264533e+01	7.985187e+00	-6.687321	1.712055e+02

Figure 3: Top 15 countries by life expectancy.

income_inequality	69.0	3.520145e+01	3.390000e+01	24.100000	5.480000e+01

See Table 4 for the key statistics.

9 Conclusion

In 2022, GDP per capita is positively associated with life expectancy (Figure 1).
Other indicators such as inequality and unemployment may also relate to health outcomes, although the strength and direction of these relationships vary across countries. The indicators in this report come from the World Development Indicators database (World Bank 2026).

Preston, Samuel H. 1975. "The Changing Relation Between Mortality and Level of Economic Development." *Population Studies* 29 (2): 231–48.
World Bank. 2026. "World Development Indicators." World Bank Open Data.