DATASCI 350 - Assignment 05: WDI 2022 Report

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Table of contents

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(217, 14)
```

1 Exploratory Data Analysis (EDA)

In this section, we explore three indicators: **GDP per capita**, **life expectancy**, and **unemployment rate**.

1.1 Summary of missing values

```
adult_literacy_rate                 172
income_inequality                   148
primary_school_enrolment_rate        55
education_expenditure_gdp_share      54
inflation_rate                       39
exports_gdp_share                    35
```

```
unemployment_rate              31
health_expenditure_gdp_share   25
measles_immunisation_rate      24
gdp_growth_rate                 8
dtype: int64
```

1.2 1) GDP per capita (gdp_per_capita)

```
count       209.000000
mean      21142.747417
std       31040.300784
min         302.992505
25%        2899.160475
50%        7655.594210
75%       28360.304147
max      226052.001905
Name: gdp_per_capita, dtype: float64


(             country   gdp_per_capita
 130          Monaco    226052.001905
 114   Liechtenstein    188055.003235
 116      Luxembourg    123719.658916
 21          Bermuda    121613.939984
 147          Norway    109269.520580
 93          Ireland    105190.685953
 188     Switzerland     94394.510680
 36    Cayman Islands     93030.705145
 171       Singapore     90299.069464
 159           Qatar     88701.468976,
                     country  gdp_per_capita
 112                 Liberia      744.617175
 44        Congo, Dem. Rep.      687.738588
 143                   Niger      609.745148
 119                  Malawi      604.269740
 134              Mozambique      578.251664
 176      Somalia, Fed. Rep.      573.141166
 118              Madagascar      503.514533
 37    Central African Republic   467.359825
 0               Afghanistan      357.261153
 31                  Burundi      302.992505)
```

Finding: GDP per capita varies widely across countries, with a long right tail (a few very high-income countries).

1.3 2) Life expectancy (life_expectancy)

```
count    217.000000
mean      73.108020
std        7.942539
min       18.818000
25%       67.788000
50%       74.160976
75%       78.531000
max       85.746000
Name: life_expectancy, dtype: float64
```

```
(                     country  life_expectancy
 130                   Monaco        85.746000
 164               San Marino        85.708000
 114            Liechtenstein        84.121951
 4                    Andorra        84.016000
 98                     Japan        83.996341
 69           French Polynesia        83.859000
 86       Hong Kong SAR, China        83.660976
 188              Switzerland        83.604878
 75                 Gibraltar        83.517000
 10                 Australia        83.200000,
                      country  life_expectancy
 20                     Benin           60.475
 81                    Guinea           60.432
 143                    Niger           60.398
 122                     Mali           60.035
 178              South Sudan           57.203
 111                  Lesotho           56.812
 38                      Chad           54.528
 144                   Nigeria           54.079
 176        Somalia, Fed. Rep.           53.931
 37    Central African Republic           18.818)
```

Finding: Life expectancy is more concentrated than GDP per capita, but still shows large differences across countries.

1.4 3) Unemployment rate (unemployment_rate)

```
count    186.000000
mean       7.196930
std        5.845956
min        0.130000
25%        3.484750
50%        5.337000
75%        9.194500
max       36.472000
Name: unemployment_rate, dtype: float64
```

```
(                         country   unemployment_rate
 63                       Eswatini             36.472
 177                 South Africa             33.268
 54                       Djibouti             26.272
 213             West Bank and Gaza            24.420
 25                       Botswana             23.615
 70                          Gabon             20.319
 45                    Congo, Rep.             20.131
 136                       Namibia             19.615
 184  St. Vincent and the Grenadines           19.277
 113                          Libya             19.238,
            country   unemployment_rate
 175  Solomon Islands            1.475
 14           Bahrain            1.265
 108          Lao PDR            1.209
 38              Chad            1.081
 192         Thailand            0.940
 31           Burundi            0.909
 129          Moldova            0.909
 143            Niger            0.403
 33          Cambodia            0.245
 159            Qatar            0.130)
```

Finding: Unemployment rates vary across countries and may include outliers (very high unemployment).

1.5 Relationships between indicators (quick check)

	gdp_per_capita	life_expectancy	unemployment_rate
gdp_per_capita	1.000000	0.570982	-0.200769
life_expectancy	0.570982	1.000000	-0.115117
unemployment_rate	-0.200769	-0.115117	1.000000

Finding: GDP per capita is typically positively associated with life expectancy (r > 0), while unemployment may not have a strong linear relationship with the other two. ## Visualisations

1.6 Relationship between GDP per capita and Life Expectancy
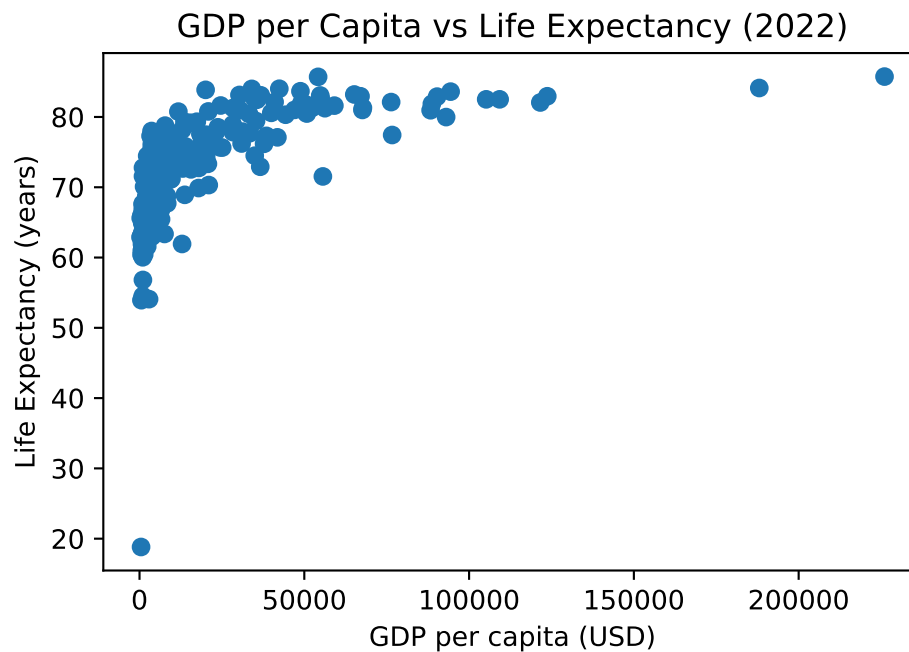

Figure 1: Figure 1: Relationship between GDP per capita and life expectancy (World Bank WDI, 2022).

As shown in Figure 1, countries with higher GDP per capita tend to have higher life expectancy.
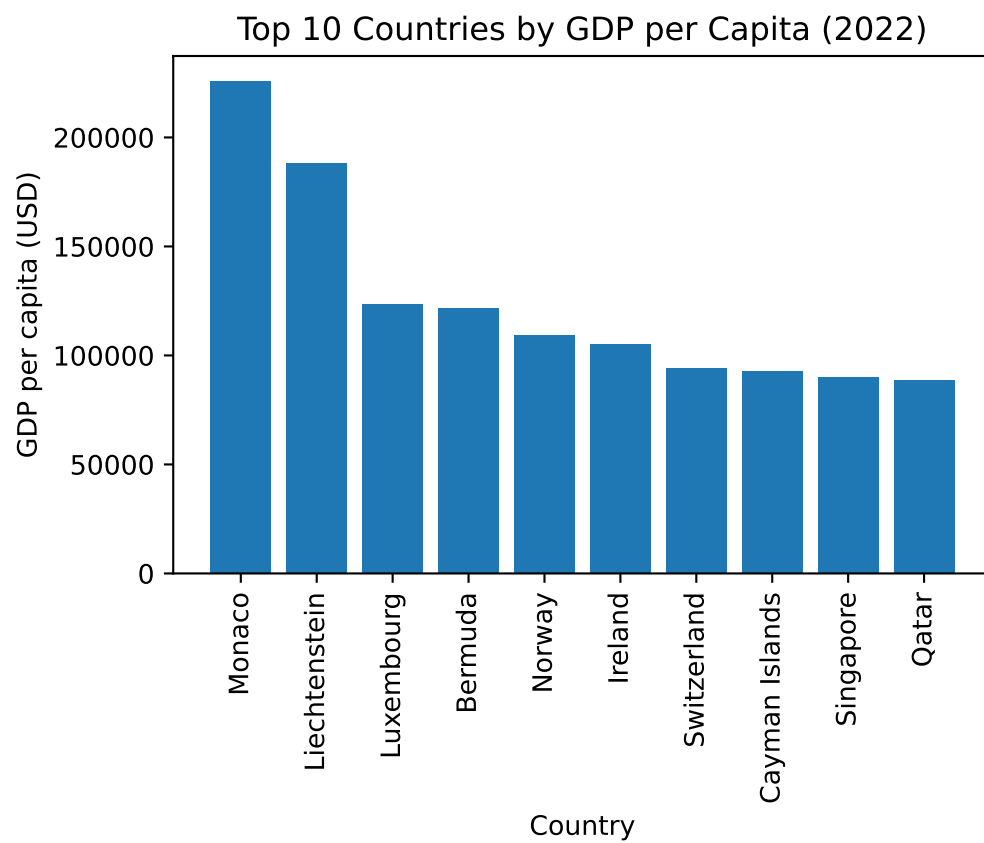
Top 10 Countries by GDP per Capita (2022)

Figure 2: Figure 2: Top 10 countries by GDP per capita (World Bank WDI, 2022).

1.7 Top 10 Countries by GDP per Capita

Figure Figure 2 highlights the substantial differences among the highest-income countries. ## Key Statistics Table

Table Table 2 summarizes key descriptive statistics for the three indicators used in the EDA.

Table 2: Table 1: Key statistics for selected indicators (World Bank WDI, 2022).

	count	mean	std	min	25%	50%	75%
gdp_per_capita	209.0	21142.747417	31040.300784	302.992505	2899.160475	7655.594210	28360
life_expectancy	217.0	73.108020	7.942539	18.818000	67.788000	74.160976	78.531
unemployment_rate	186.0	7.196930	5.845956	0.130000	3.484750	5.337000	9.1945

As shown in Table 2, GDP per capita has the largest spread, while life expectancy is more concentrated. Figures Figure 1 and Figure 2 provide visual context for these patterns. bibliography: references.bib The data in this report come from the World Bank World Development Indicators (WDI) dataset (World Bank 2024b).

GDP per capita is measured as current US dollars (indicator code NY.GDP.PCAP.CD) (World Bank 2024a).

World Bank. 2024a. "GDP Per Capita (Current US$) - NY.GDP.PCAP.CD." World Bank Data Indicator Metadata.

———. 2024b. "World Development Indicators." World Bank Open Data.