Assignment 05

Vicente Martinez

2026-02-23

Assignment 04

Exploratory Analysis

Data source: World Bank World Development Indicators (WDI) (World Bank 2026).

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

data = pd.read_csv('wdi.csv')

print("\n=== GDP GROWTH RATE ===")
print(data['gdp_growth_rate'].describe())
print(f"Observations: {len(data)}")
print(f"Proportion of Increasing GDP: {(data['gdp_growth_rate'].dropna() > 0).sum()/len(data)
```

```
=== GDP GROWTH RATE ===
count    202.000000
mean       4.368901
std        6.626811
min      -28.758591
25%        2.438593
50%        4.204431
75%        6.200000
max       63.439864
Name: gdp_growth_rate, dtype: float64
Observations: 217
Proportion of Increasing GDP: 0.8433179723502304
```

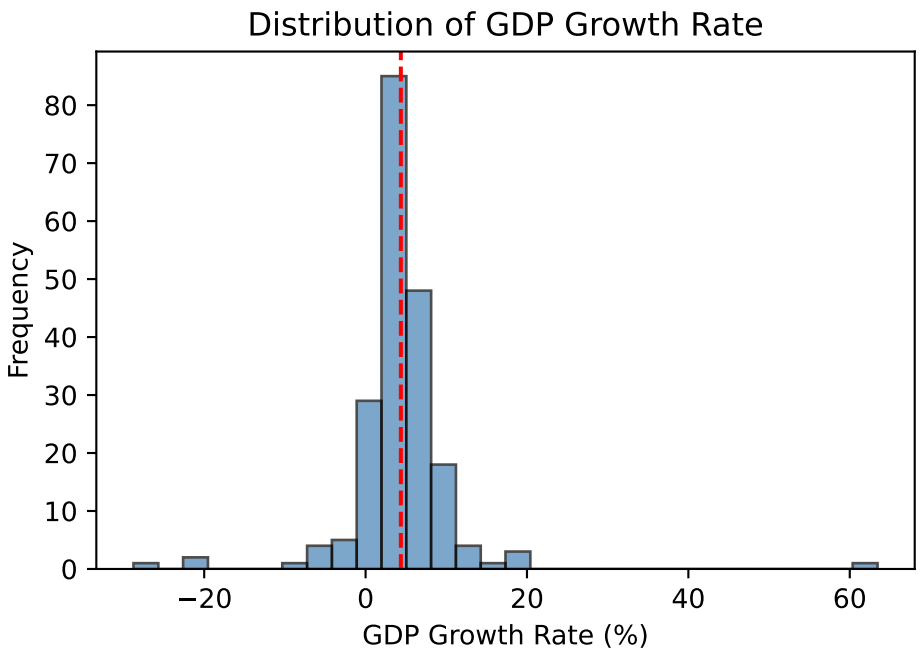

Figure 1: Plot of GDP Growth Rate Distribution

```
data_plot2 = data.dropna(subset=['measles_immunisation_rate','gdp_per_capita'])
correlation = data_plot2['gdp_per_capita'].corr(data_plot2['measles_immunisation_rate'])
print(f"\nCorrelation: {correlation:.3f}")
print(f"Observations: {len(data_plot2)}")
```

```
Correlation: 0.314
Observations: 186
```

```
data_plot3 = data.dropna(subset=['life_expectancy','gdp_per_capita'])
correlation = data_plot3['gdp_per_capita'].corr(data_plot3['life_expectancy'])
print(f"\nCorrelation: {correlation:.3f}")
print(f"Observations: {len(data_plot3)}")
```

```
Correlation: 0.639
Observations: 197
```

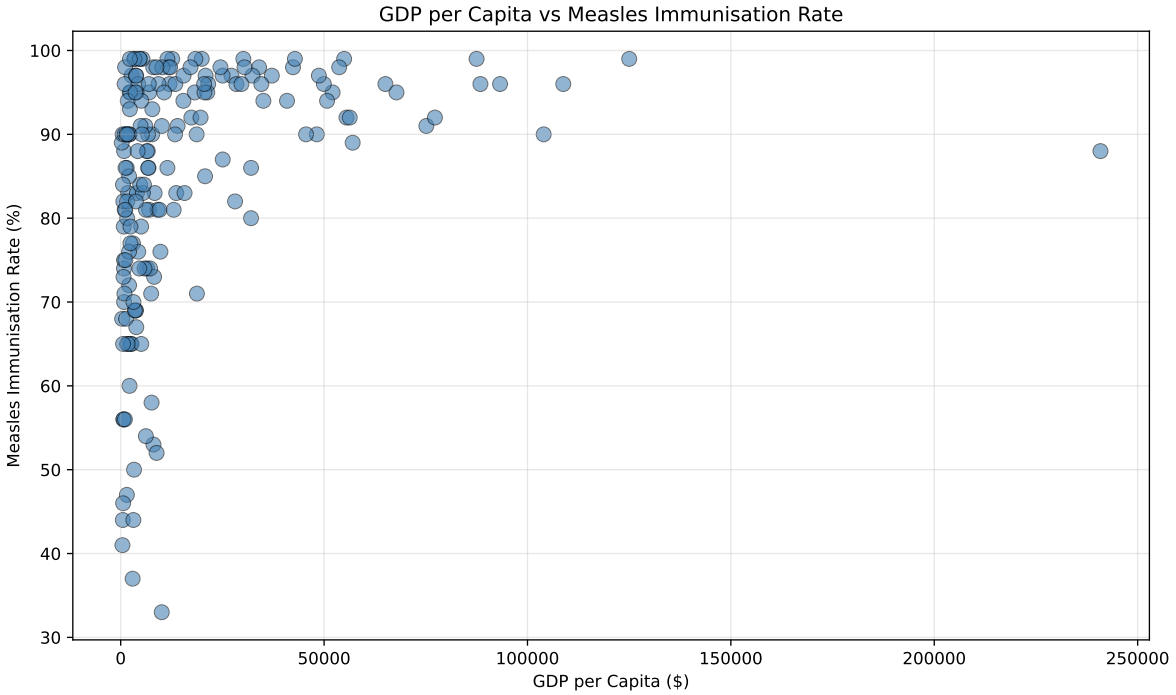

Figure 2: Relationship between GDP per Capita and Measles Immunisation Rate

Table 1: Table of Key Statistics

Variable	Observations	Mean	Std. Dev.	Min	Median	Max	Correlation
GDP Growth Rate (%)	202	4.37	6.63	-28.76	4.20	63.44	—
Proportion of Countries with Positive GDP	217	0.843	—	—	—	—	—
GDP per Capita vs Immunisation Rate	186	—	—	—	—	—	0.314
GDP per Capita vs Life Expectancy	197	—	—	—	—	—	0.639

Analysis

From the data gathered from the World Bank (World Bank 2026), I was able to perfrom a few analyses.

As shown in Table 1, the average GDP growth rate across countries is 4.37%, with substantial

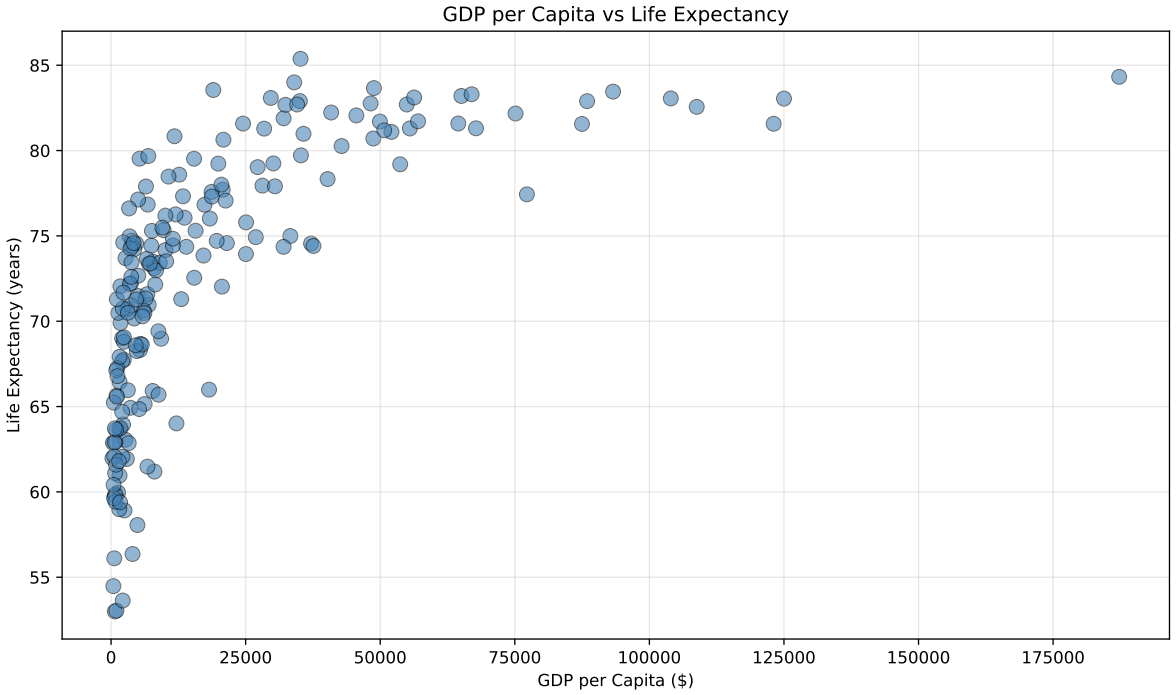

Figure 3: Relationship between GDP per Capita and Life Expectancy

dispersion given the standard deviation of 6.63. The minimum value of -28.76% highlights extreme economic contractions in some countries.

The distribution of GDP growth rates is illustrated in Figure 1, which shows a right-skewed distribution with several high-growth outliers. The histogram confirms that most countries cluster between 0% and 10% growth.

The relationship between GDP per capita and measles immunisation is presented in Figure 2. As reported in Table 1, the correlation is 0.314, indicating a moderate positive association.

In contrast, Figure 3 shows a stronger relationship between GDP per capita and life expectancy. The correlation of 0.639 (see Table 1) suggests a substantially stronger link between income levels and longevity outcomes. This follows what has previously been established as seen in Preston's seminal work (Preston 1975).

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." https://databank.worldbank.org/source/world-development-indicators.