QTM 350 Assignment 5

Minsol Kim

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```python
import pandas as pd
import wbgapi as wb
import matplotlib.pyplot as plt
import seaborn as sns

# Define the indicators to download
indicators = {
    'gdp_per_capita': 'NY.GDP.PCAP.CD',
    'gdp_growth_rate': 'NY.GDP.MKTP.KD.ZG',
    'inflation_rate': 'FP.CPI.TOTL.ZG',
    'unemployment_rate': 'SL.UEM.TOTL.ZS',
    'total_population': 'SP.POP.TOTL',
    'life_expectancy': 'SP.DYN.LE00.IN',
    'adult_literacy_rate': 'SE.ADT.LITR.ZS',
    'income_inequality': 'SI.POV.GINI',
    'health_expenditure_gdp_share': 'SH.XPD.CHEX.GD.ZS',
    'measles_immunisation_rate': 'SH.IMM.MEAS',
    'education_expenditure_gdp_share': 'SE.XPD.TOTL.GD.ZS',
    'primary_school_enrolment_rate': 'SE.PRM.ENRR',
    'exports_gdp_share': 'NE.EXP.GNFS.ZS'
}

# Get the list of country codes for the "World" region
country_codes = wb.region.members('WLD')

# Download data for countries only in 2022
df = wb.data.DataFrame(indicators.values(), economy=country_codes, time=2022, skipBlanks=True

# Delete the 'economy' column
df = df.drop(columns=['economy'], errors='ignore')
```

```
# Create a reversed dictionary mapping indicator codes to names
# Rename the columns and convert all names to lowercase
df.rename(columns=lambda x: {v: k for k, v in indicators.items()}.get(x, x).lower(), inplace=

# Sort 'country' in ascending order
df = df.sort_values('country', ascending=True)

# Reset the index after sorting
df = df.reset_index(drop=True)

# Save the data to a CSV file
df.to_csv('wdi.csv', index=False)
```

```
df2 = df.copy()

top5_inflation = df2.nlargest(5, 'inflation_rate')
top5_gdpgrowth = df2.nlargest(5, 'gdp_growth_rate')
top5_unemployment = df2.nlargest(5, 'unemployment_rate')
```

Top 5 Countries with Highest Inflation inflation_rate

```
top5_inflation[['country', 'inflation_rate']]
```

```
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In future versions `DataFrame.to_latex` is expected to utilise the base implementation of `St
```

	country	inflation_rate
110	Lebanon	171.205491
185	Sudan	138.808460
216	Zimbabwe	104.705171
198	Turkiye	72.308836
186	Suriname	52.446027

In 2022, the countries with the highest inflation rates were Lebanon, Sudan, Zimbabwe, Turkiye and Suriname. In Lebanon, Sudan and Zimbabwe, in particular, we can see that prices more than doubled since 2021 which is alarming. All of the countries listed above are developing countries, and with inflation rates greater than 50%, they are suffering from hyperinflation.

Top 5 Countries with Highest GDP Growth Rate

```
top5_gdpgrowth[['country', 'gdp_growth_rate']]
```

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	country	gdp_growth_rate
83	Guyana	63.439864
66	Fiji	20.016464
182	St. Lucia	18.075380
32	Cabo Verde	17.439079
169	Seychelles	14.976851

The top five countries with the highest GDP growth rates are Guyana (63.44%), Fiji (20.02%), St. Lucia (18.08%) , Cabo Verde (17.44%), and Seychelles (14.98%). Guyana leads with a significant growth rate, primarily driven by its expanding oil industry. The other countries are also experiencing significant growth due to factors like tourism recovery and economic diversification efforts. This trend highlights the potential for smaller or emerging economies to achieve rapid development.

Top 5 Countries with Highest Unemployment Rate

```
top5_unemployment[['country', 'unemployment_rate']]
```

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	country	unemployment_rate
63	Eswatini	37.852
177	South Africa	28.838
54	Djibouti	26.367
213	West Bank and Gaza	24.420
25	Botswana	23.615

The top five countries with the highest unemployment rates are Eswatini (37.85%), South Africa (28.84%), Djibouti (26.37%), West Bank and Gaza (24.42%), and Botswana (23.62%). These high rates likely come from a mix of factors like limited job opportunities, structural issues in the labor market, and, in some cases, political instability. Southern African countries are particularly affected, pointing to regional economic challenges. In the West Bank and Gaza, ongoing war and restrictions seems to be causing high unemployment.
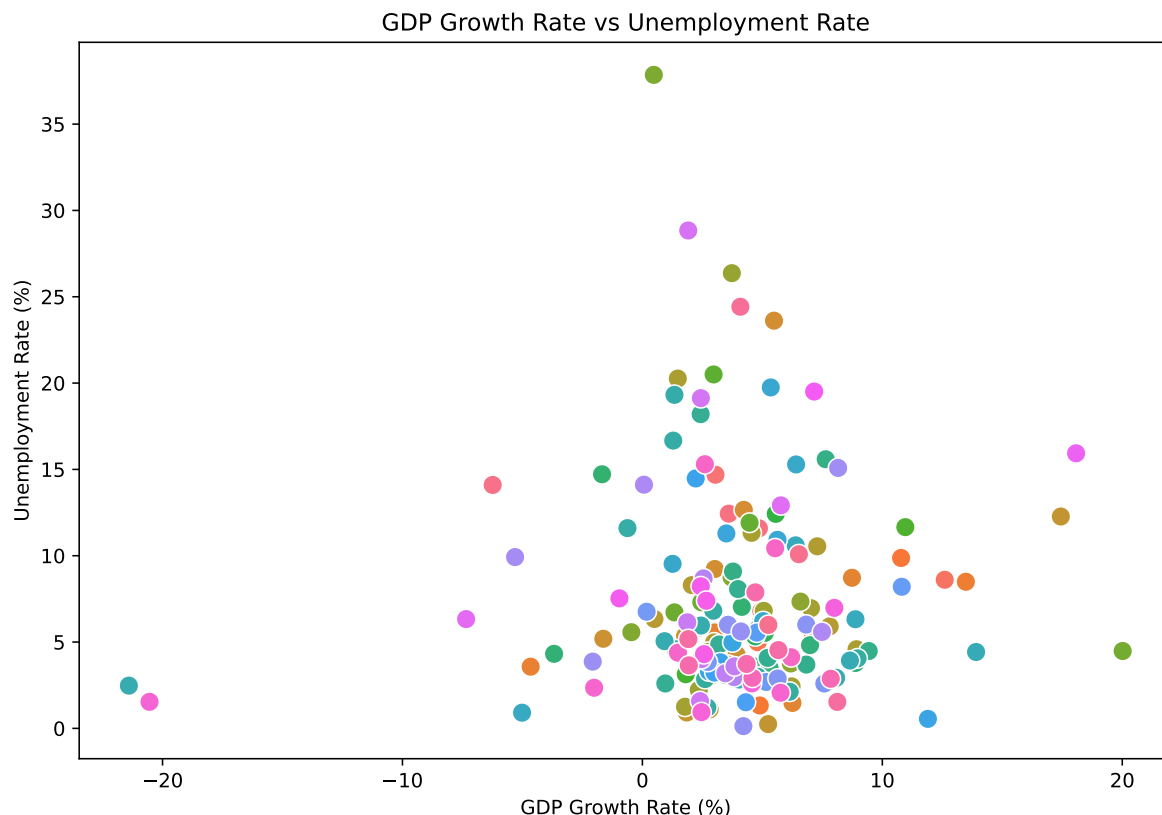
GDP growth rate and Unemployment Rate

Figure 1: Scatter plot showing the relationship between GDP growth rate and unemployment rate. (World Bank 2023)

Figure 1 illustrates the relationship between GDP growth rate and unemployment rate across various countries. Each point represents a country, with annotations for clarity. The scatter plot shows a diverse range of economic situations, with no clear overall correlation between GDP growth and unemployment rates. According to economic theory, we would typically expect an inverse relationship: higher GDP growth should correlate with lower unemployment rates. However, this data demonstrates that economic theory is sometimes not supported

Table 1: Summary Statistics of GDP per Capita

	gdp_per_capita
mean	20345.707649
std	31308.942225
min	259.025031
max	240862.182448
0.25	2570.563284
0.5	7587.588173
0.75	25982.630050

by empirical evidence, highlighting the complex nature of real-world economic relationships. (Meyer and Tasci 2012)

Top 20 countries by GDP per capita

Figure 2 presents a horizontal bar chart showing the top 20 countries ranked by GDP per capita, a measure of economic output per person calculated by dividing a country's total GDP by its population. This visualization illustrates the relative economic prosperity of the highest-ranking nations, providing insights into average living standards and economic productivity.

Summary Statistics of GDP per Capita

```
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```

```
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```

- The table of key GDP per capita statistics is presented in Table 1, providing a summary of the mean, standard deviation, and key percentiles.

- Figure 2 presents a horizontal bar chart showing the top 20 countries ranked by GDP per capita.

Meyer, Brent, and Murat Tasci. 2012. "An Unstable Okun's Law, Not the Best Rule of Thumb." *Economic Commentary*, no. 2012-08. https://doi.org/10.26509/frbc-ec-201208.
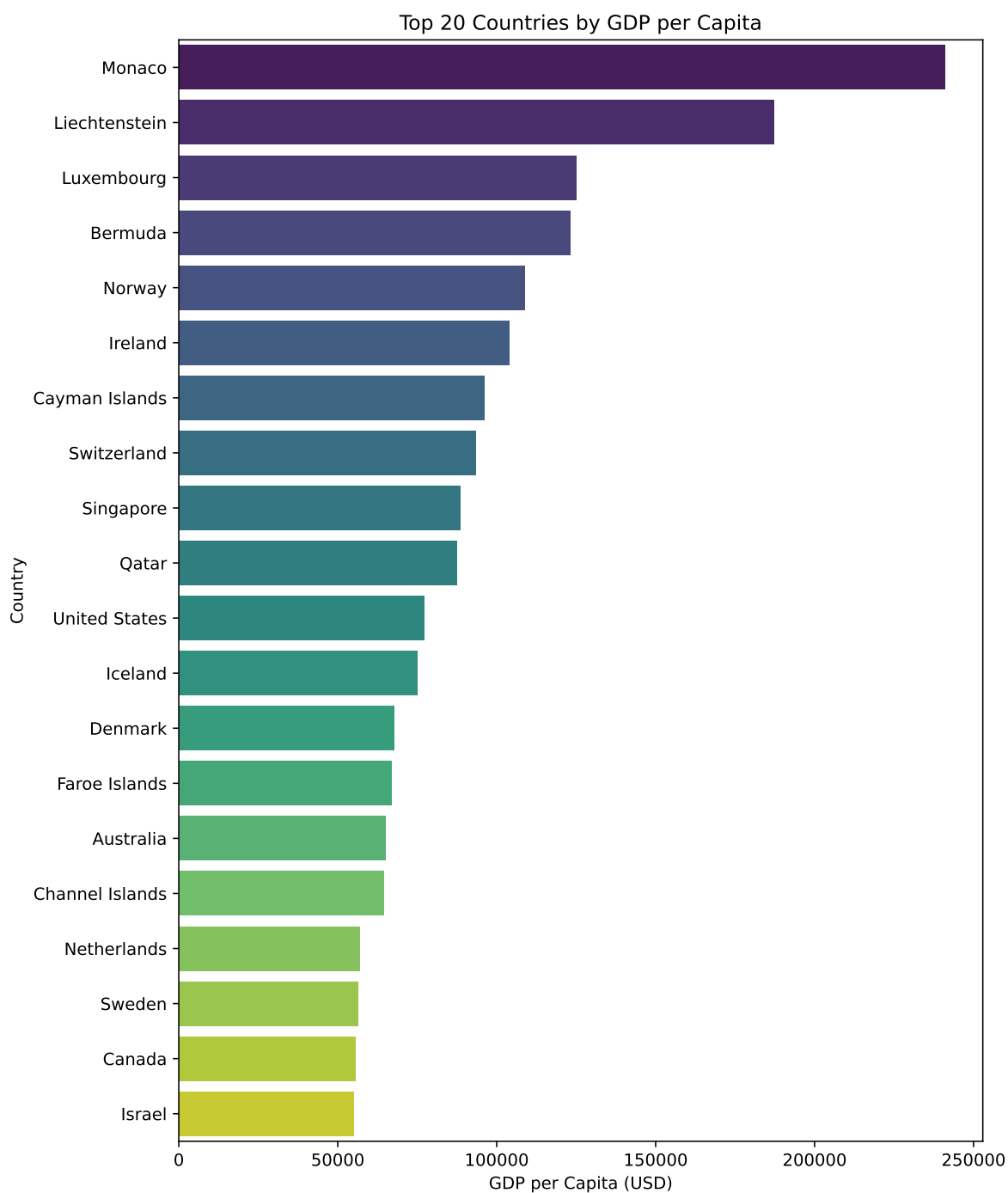World Bank. 2023. "World Bank API." https://datahelpdesk.worldbank.org/knowledgebase/articles/889392-about-the-indicators-api-documentation.

Figure 2: Top 20 countries by GDP per capita (World Bank 2023)