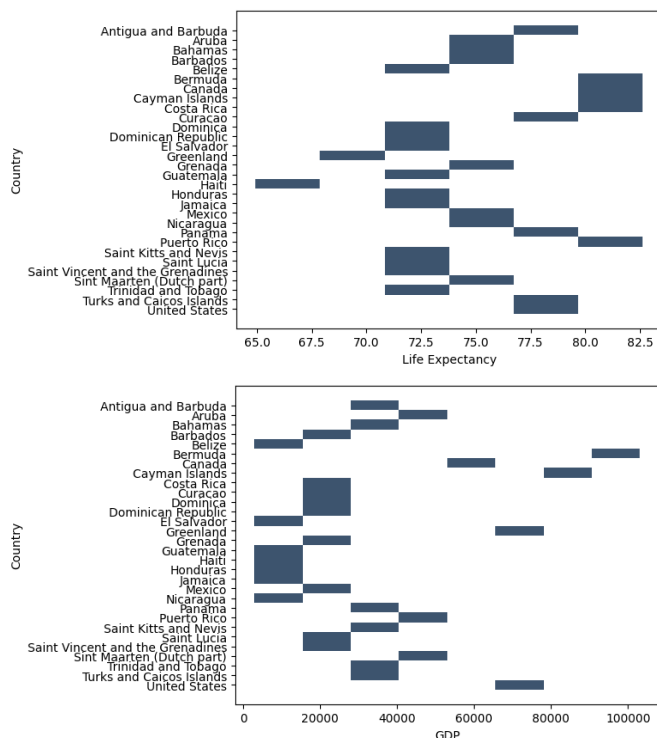# Introduction

Our goal during this project is to determine whether or not GDP per capita has an effect on life expectancy. This question is important because GDP per capita is a measure of economic output in terms of population, and our life expectancy factor indicates the health of the population as well as the quality of life. The relationship between economic resources and human well-being in a country can help explain whether this wealth factor alone can predict how long people will live. This question matters to us because it shows how much of an impact economic conditions have on a person's life, and even life expectancy. In our conclusion, we expect to find a positive relationship between GDP per capita and life expectancy, showing that while GDP per capita increases, so does life expectancy.

Data

We will use data from Eurostat, the World Bank, the Wiley Online Library, and Our World in Data to collect information on GDP per capita as well as life expectancy. We had to clean our data by removing years and focusing on 2023, dropping NaN values, removing countries that were not included in both datasets, taking a log of GDP per capita, and merging the two datasets into one.
The histograms below show life expectancy and GDP per capita for only North American countries to keep the figures simple.
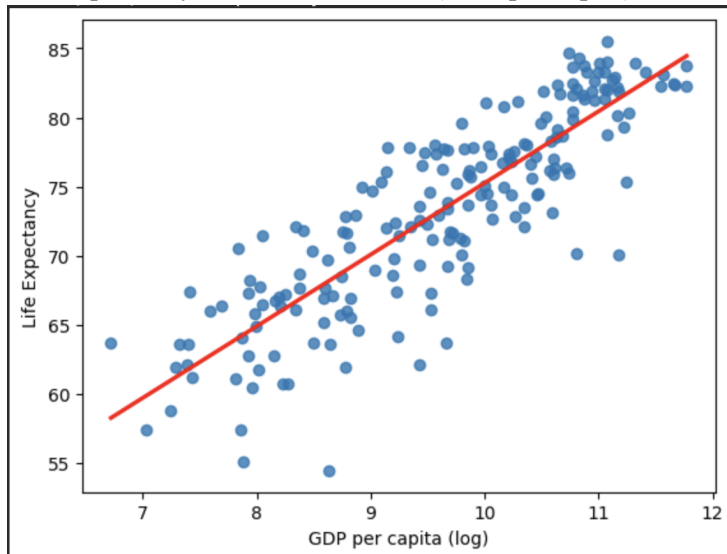
Methods

The overall goal of our model is to answer whether GDP per capita is positively related to life expectancy.

We plan to run an OLS model to determine if there is a relationship between life expectancy and GDP per capita. Our dependent variable is life expectancy, and our independent variable is GDP per capita. From the model, we will get Life expectancy = beta_0 + beta_1 * GDP per Capita + epsilon. The model will give us an intercept, which represents what life expectancy will be on average when GDP per capita is 0. The model will always give us a slope coefficient, which will represent the expected average change in life expectancy when GDP per capita increases by 1 unit. A limitation of our model could potentially be the influence of other confounding variables that we did not control for.

Results, Analysis, and Conclusion

Life expectancy = 68.14 + 0.0002 * (GDP per capita)

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	68.1353	0.480000	142.045	0.0	67.189	69.081
GDP_per_capita	0.0002	0.000013	15.430	0.0	0.000	0.000

We found that for every one unit increase in GDP per capita, life expectancy increases by 0.0002 years on average. For example, if GDP per capita increases by $10,000, life expectancy on average will increase by about 2 years. Our intercept is 68.14 which means for a country with GDP per capita of 0, the average life expectancy is 68.14 years. The p-value we found from our model is 0, showing that the relationship between life expectancy and GDP per capita is statistically significant. Overall, our model suggests that countries with a higher GDP per capita have a higher life expectancy.

References

GDP per capita. (2025). Our World in Data. https://ourworldindata.org/grapher/gdp-per-capita-worldbank?tab=table&overlay=download-data

Life expectancy. (n.d.). Our World in Data. https://ourworldindata.org/grapher/life-expectancy?tab=table