DIT406: Assignment 1

Calvin Smith

Chalmers University of Technology/University of Gothenburg

November 9, 2021

Question 1 - GDP per Capita and Life expectancy

We are working with the dataset **life-expectancy-vs-gdp-per-capita.csv** from https://ourworldindata.org/life-expectancy. The dataset contains yearly data on GDP per capita and life expectancy from different countries across the world.

a)

In order to create a scatter plot of GDP per capita and life expectancy we have to extract the data that we need for creating a meaningful plot. The following steps have been taken:

- We want to compare countries, so we need data from the same year. We have chosen data from 2018, since it is fairly recent and it doesn't contain that many missing values.
- Check for missing values. If a row has a missing value, remove it.
- We choose to plot according to the size of each country.
- The colors of the scatter plot vary according to different conditions regarding mean GDP/capita and mean Life expectancy among countries.
- We choose to plot the x-axis (GDP/capita) on a log-scale since the GDP values are skewed towards extremely high values.

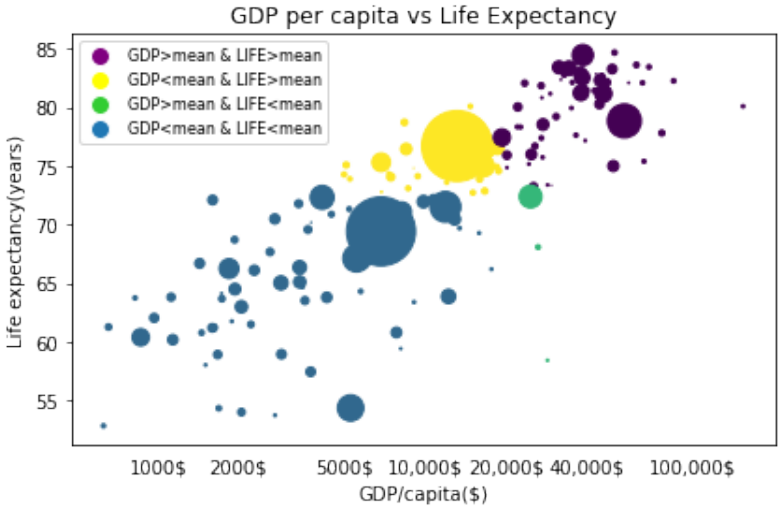

Figure 1: GDP/capita vs Life expectancy (2018)

b)

From figure 1 we can see the relationship between GDP per capita and life expectancy. The data seems to indicate a positive correlation between GDP per capita and life expectancy. Meaning that rich countries seem to have a higher life expectancy than poor countries. Is this a reasonable conclusion? Yes. In many aspects the well-being of a countries citizens depends on the economy of the country. A good economy often means less people in poverty, better healthcare and increased freedom for the individual.

c)

No.

d)

The following figure shows the countries that have a life expectancy higher than one standard deviation above the mean.

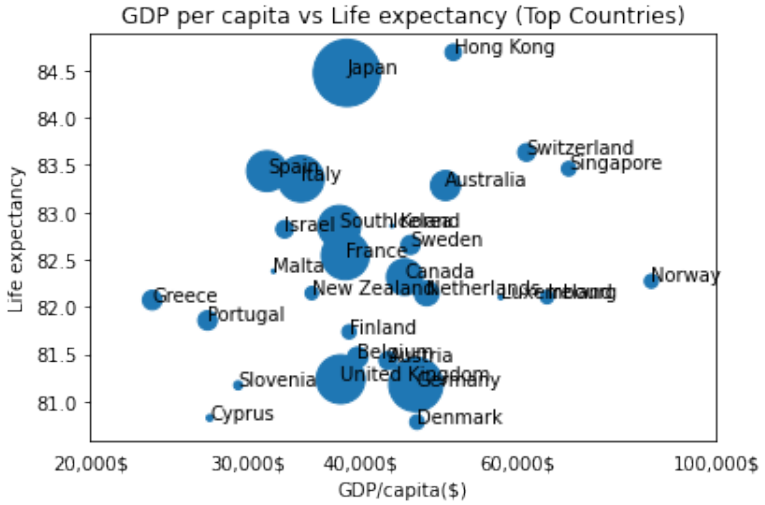

Figure 2: GDP/capita vs Life expectancy (Top countries)

e)

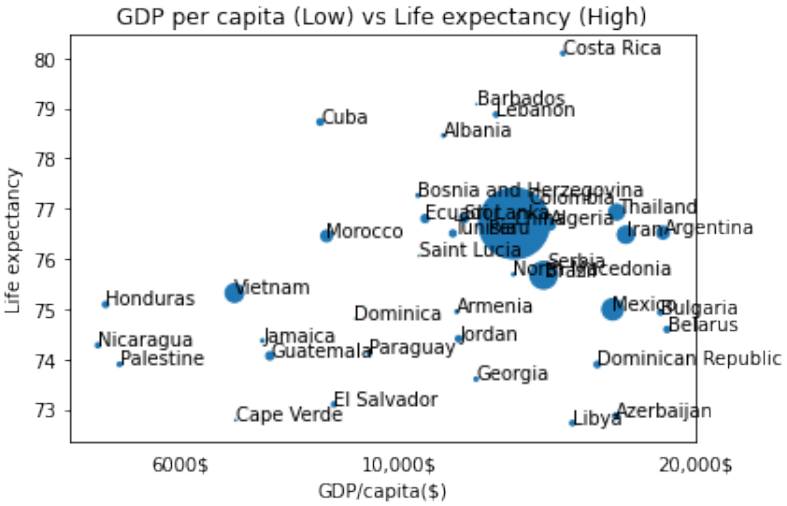

Figure 3: GDP/capita vs Life expectancy (Top countries)

Figure 3 is a scatter plot of countries that have a lower GDP/capita than the average country but at the same time has a higher life expectancy than the average country. An interesting comparison between figure 4 and figure 3 shows that Denmark, with a GDP/capita of 46,312$ has a life expectancy of 80,78

years while Costa Rica with a GDP/capita of 14,686$ (3,15 times less than Denmark) boasts a life expectancy of 80,1 years.

f)

Generally, yes. But there are exceptions. There are three countries in this dataset that have a higher than average GDP per capita but a lower than average life expectancy. Equatorial Guinea is the most prevalent example. They have a GDP per capita of 28,528$ (the mean is 18,959$) and a life expectancy of 58,4 years (the mean is 72,6). However, since the GDP distribution is quite skewed I wouldn't necessarily consider a country with a GDP above the mean to be a strong economy. So, if we instead look at for example the countries that have a GDP higher than one standard deviation above the mean, we can at least see that there is some variation amongst the richest countries. For example, Hong Kong and Saudi Arabia have fairly similar GDP per capita's but there is a large difference between life expectancy as illistrated in figure 4.

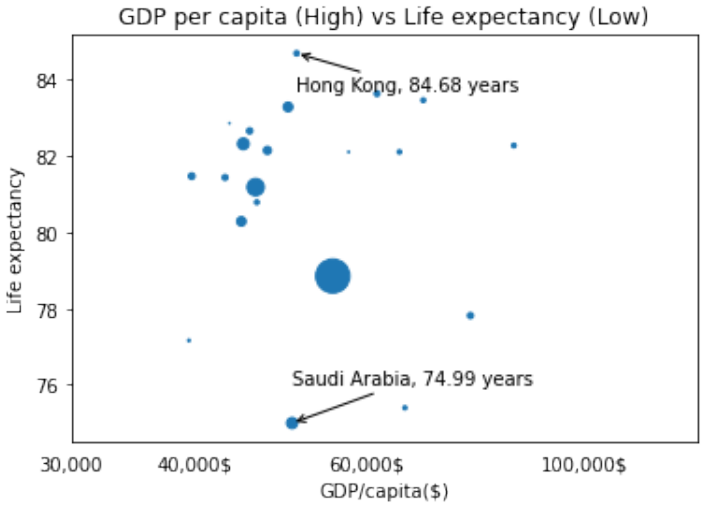

Figure 4: GDP/capita vs Life expectancy. Countries with a GDP higher than one standard deviation above the mean.

g)

GDP per capita IS one of many indicators of a strong economy. However, it doesn't seem like a strong economy is necessarily an indicator of a high life expectancy.It is probably one of perhaps many indicators and should not be blindly used to assume that a country and its citizens are happy and healthy because of a high GDP per capita. We have seen examples of poor countries with a high life expectancy as well as rich countries with a low life expectancy.

Although generally speaking, countries with a higher GDP tend to have a higher life expectancy.

Question 2

We have downloaded a dataset **gdp-vs-happiness.csv** from https://ourworldindata.org/happiness-and-life-satisfaction. The dataset consists of GDP per capita from different countries together with a Self-reported Life Satisfaction Score (LSS) that ranges from 1-10, where 1 is the lowest and 10 is the highest.

a) and b)

We will be looking at this dataset and trying to answer the following questions:

- Does a higher GDP indicate a higher life satisfaction? I.e are people in rich countries more satisfied with their lives compared to people in poor countries?
- If so, what is the magnitude of this? Is there a certain point where income doesn't affect satisfaction?
- Are there poor countries with a higher life satisfaction than rich countries?

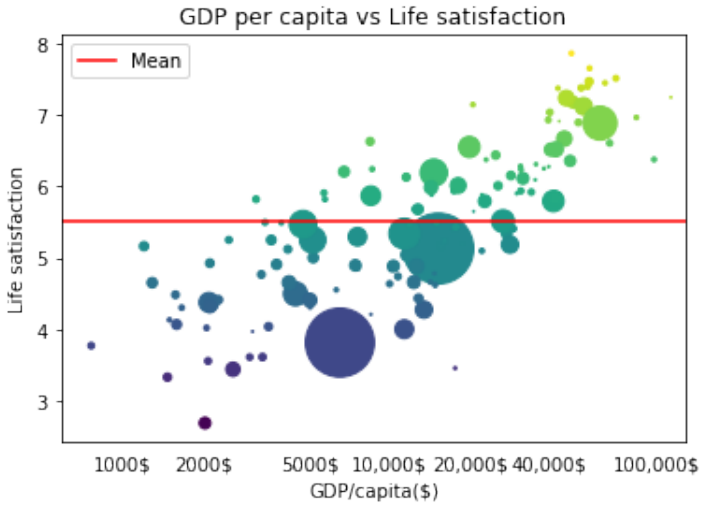

Figure 5: GDP/capita(log-scale) vs Life satisfaction.

From figure 5 we can see that there seems to be a pretty clear positive trend between GDP and Life satisfaction. That is, people in richer countries seem to be reporting a higher life satisfaction compared to people in poor countries.

However, as figure 6 illustrates, this is not always the case. Japan, with a GDP per capita of 41,182$ reported a life satisfaction score of 5,794 and Honduras, with a GDP per capita of 5,680$ reported a life satisfaction score of 5,908. Even though Honduras is a third-world country and extremely poor compared to Japan, the people still report as being happier in Honduras than in Japan. This indicates that there are also other factors contributing to the well-being of a countries population.

Furthermore, figure 6 is a histogram of life satisfaction scores across all countries. The mean life satisfaction score for all countries is 5.51. If we take the countries with a GDP lower than average and plot the same distribution we get the result in figure 8. Here we can see that the distribution is skewed to the left, with more values lying beneath the mean of 5.51. For countries with a GDP higher that the average, we can see in 9 that the distribution is quite "flat". One might have expected the distribution to be tilting towards the right and a higher life satisfaction score. Instead, we can see that life satisfaction for richer countries seems to be pretty evenly spread among both high and low values. Why is this interesting? Well, it could be an indication that the correlation between money and well-being matters more when a country is poor and when a country reaches a certain level of wealth, there are other factors that become more important.

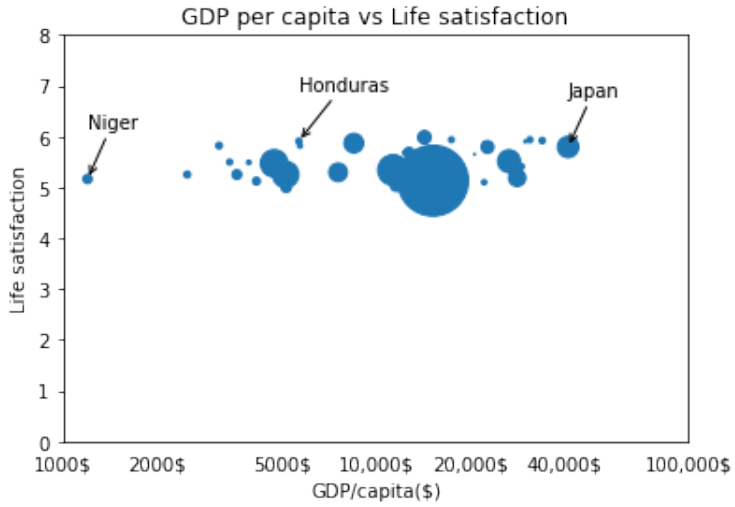

Figure 6: GDP/capita vs Life satisfaction. Japan and Niger have similar reported life satisfaction but very different GDP.

Figure 7: Distribution of life satisfaction across all countries.

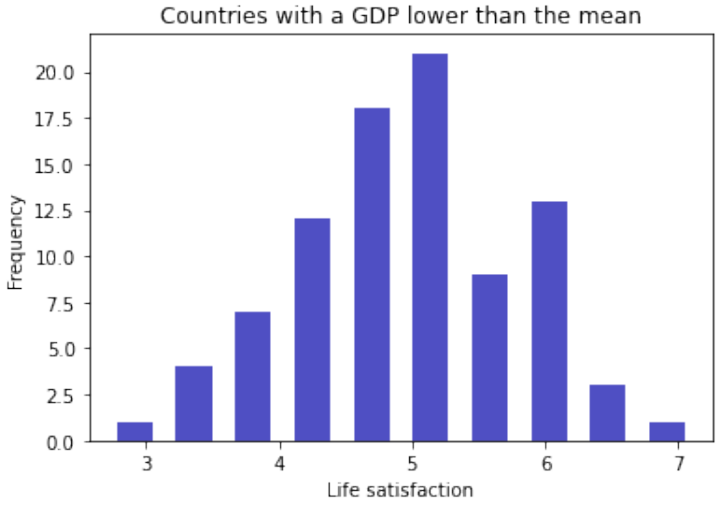

Figure 8: Distribution of life satisfaction for countries with a GDP lower than the average.

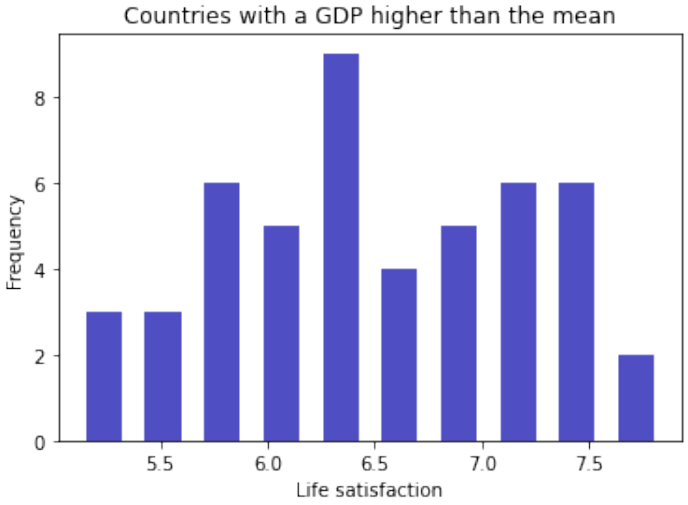

Figure 9: Distribution of life satisfaction for countries with a GDP higher than the average.