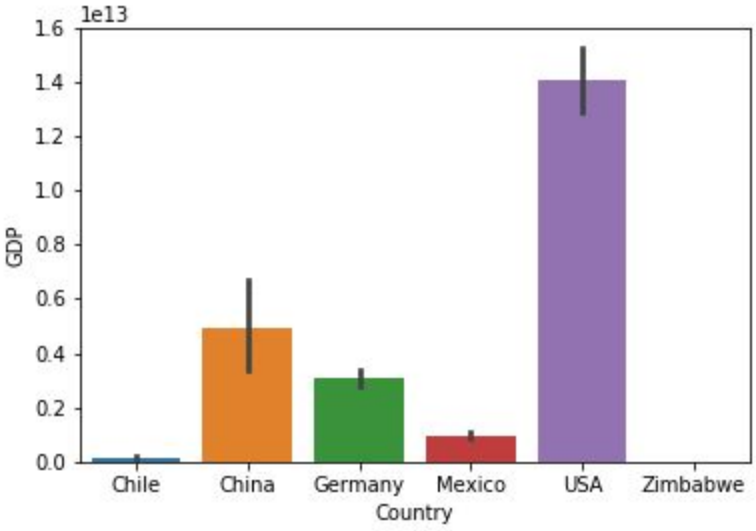
A stronger national economy may not help you live longer, but it won't hurt either.

Using data sourced from the World Bank and World Health Organisation and provided by Codecademy, we investigated the relationship between gross domestic product (GDP) and life expectancy at birth. The data reviewed covered six countries Chile, China, Germany, Mexico, USA, Zimbabwe from 2000 to 2015. While it might seem straightforward that a country with more wealth (measured by GDP) would have a longer life expectancy, the numbers paint a slightly more nuanced story.

Gross domestic product, commonly referred to simply as GDP, is one of the most common measurements of a country's wealth and prosperity. Wikipedia described GDP as "a monetary measure of the market value of all the final goods and services produced in a period of time". Life expectancy at birth ("life expectancy" or "LEABY") is another metric, commonly used for measuring a population's health. It is an estimation of the average expected lifespan of an individual born at a particular point in time.

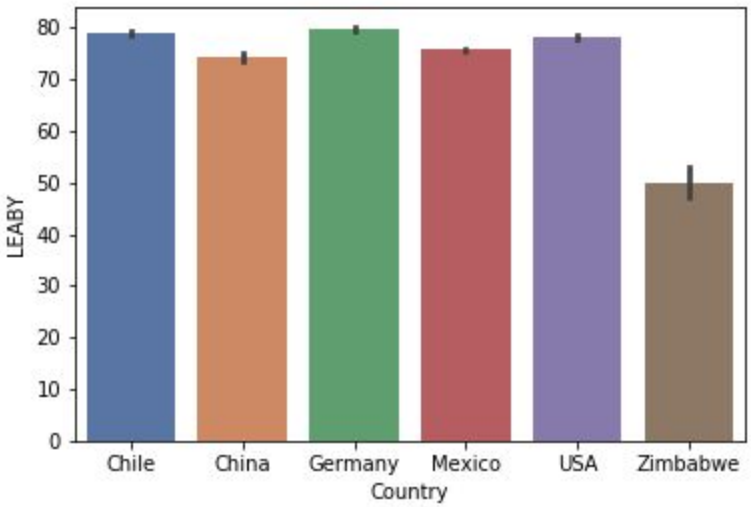
Our investigation set out to determine if there is a relationship between GDP and life expectancy. We analysed the data, and let's see what we found…

First, we looked at the average GDP over the period. By far, the US held the position of highest GDP. Zimbabwe, by comparison, hardly registered on the graph. Chile's GDP appeared only slightly higher than Zimbabwe's.

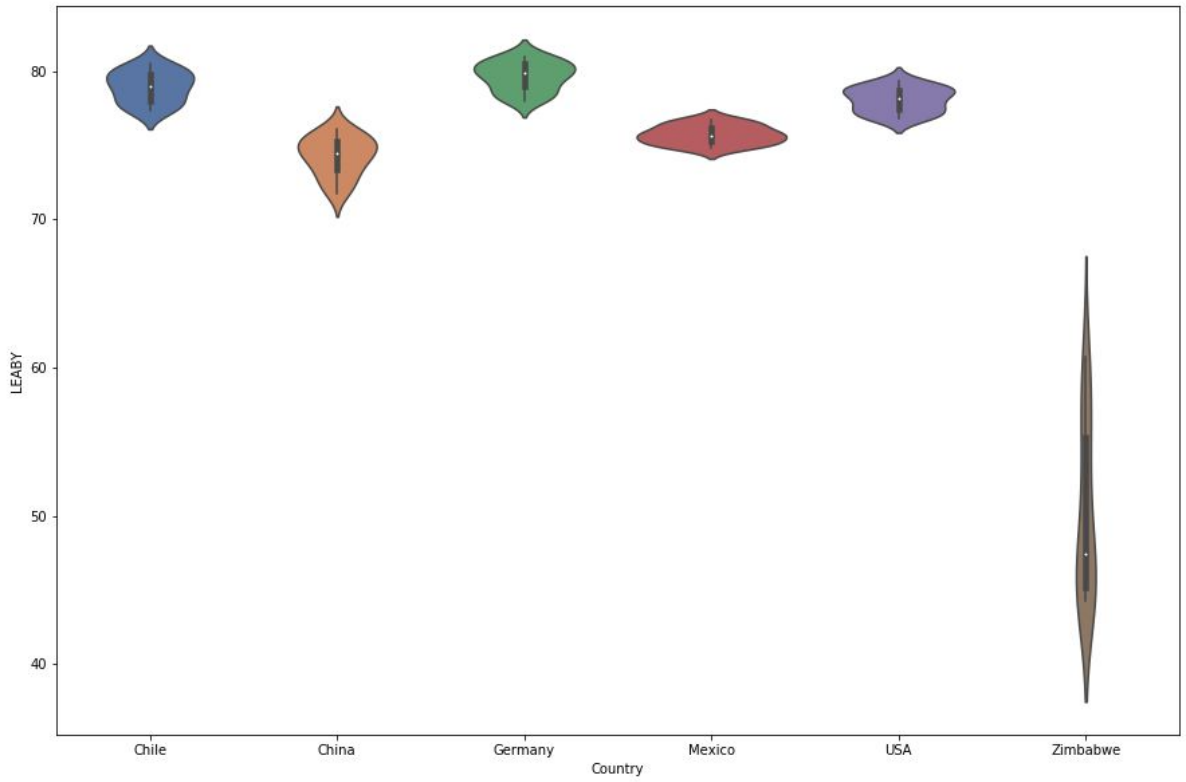


Next, we looked at the average life expectancy.

Germany has the highest average life expectancy, followed by Chile. ...But wait, didn't Chile have the second lowest GDP?



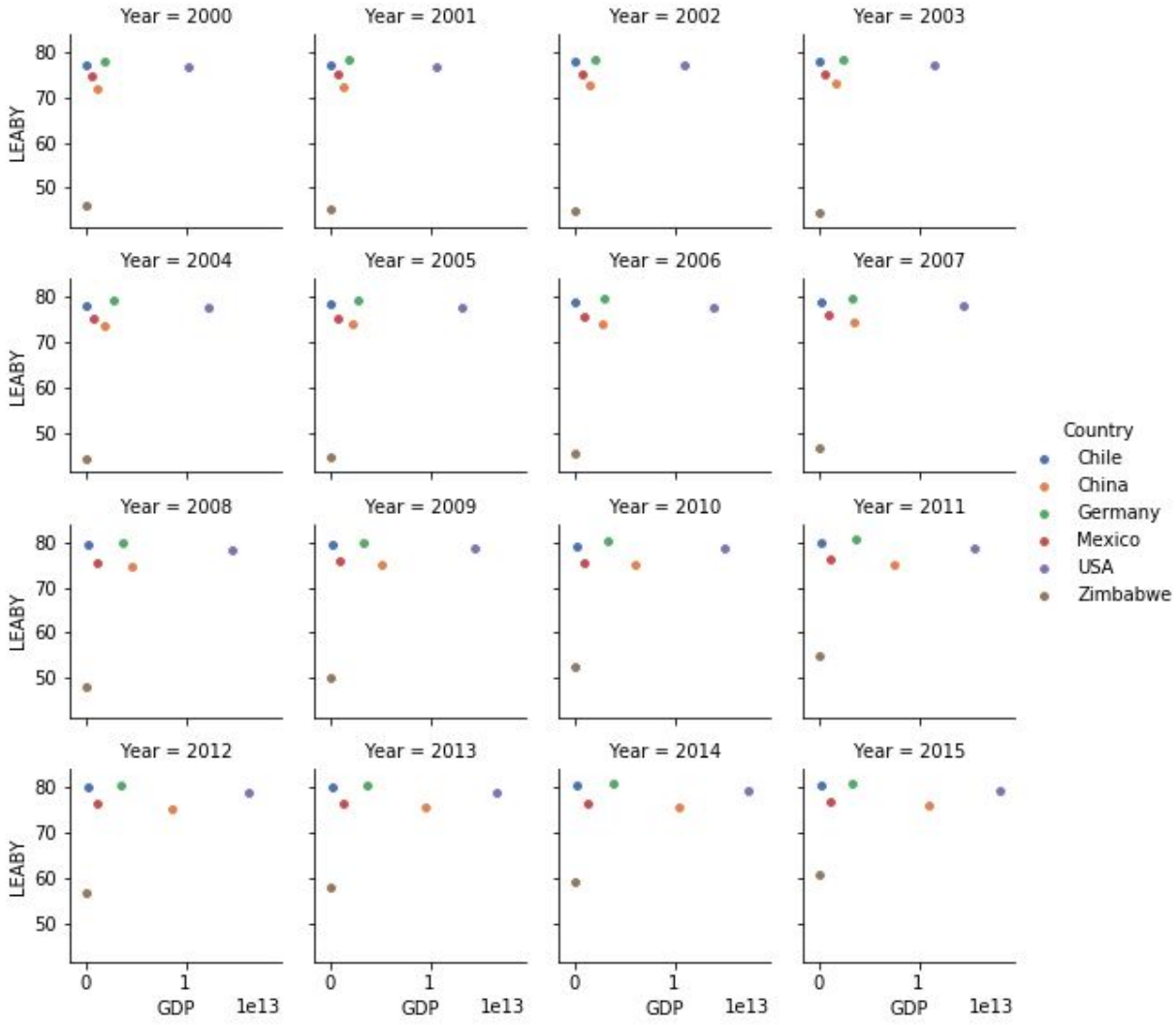
So we took a different look… When we plotted the life expectancy results into a violin graph to better illustrate the distribution, we saw a another story. While most nations tended to isolate around higher life expectancies, and within themselves, having greater distribution at the higher range, Zimbabwe was quite different. It had a much longer range and greater variance in its life expectancy.



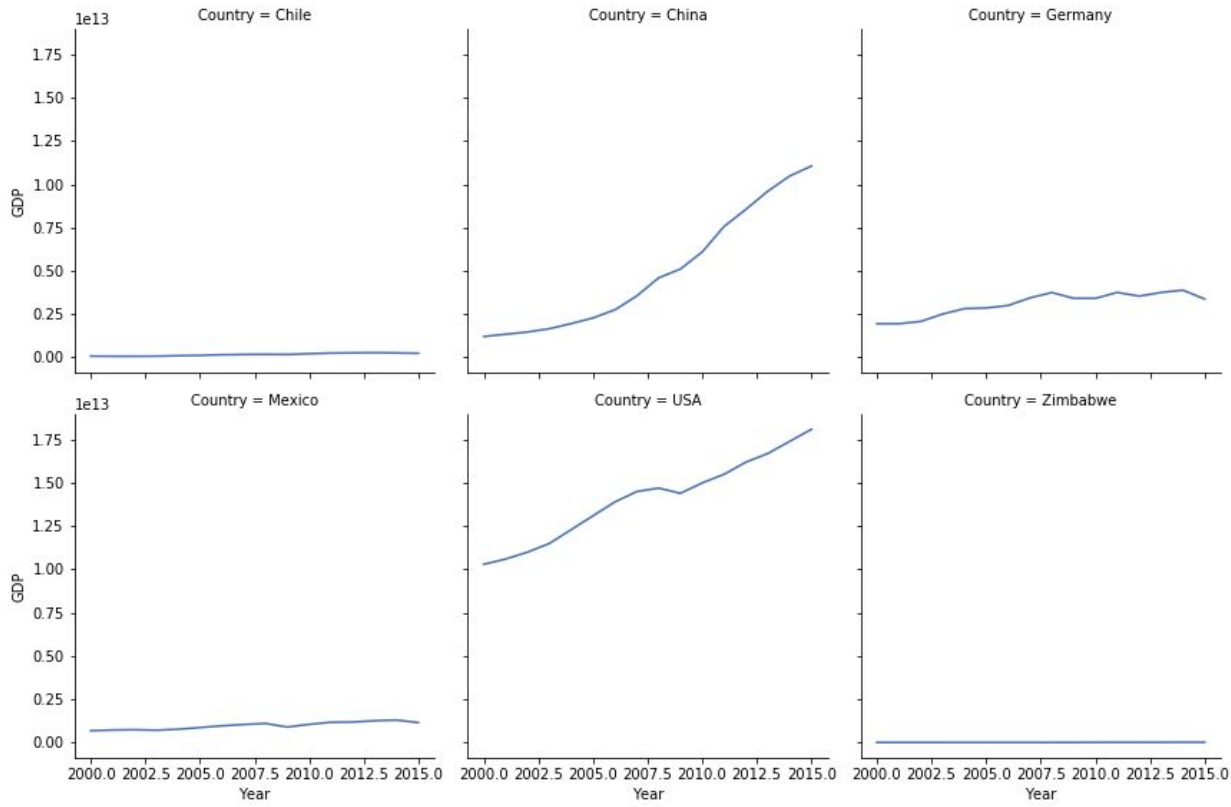
But how had life expectancy changed for each country over time? To investigate this, we plotted a facet grid of scatter graph plots. It is here, if there were a definitive correlation, between GDP and life expectancy that I would expect to see a pattern, but well… no. ...and yes.

For a direct correlation, we would expect to see some kind of curve, say lower GDP correlating to lower life expectancy, then as GDP grows slowly, life expectancy does as well. No such pattern emerges, at any one time, or even over time. But another pattern does emerge…

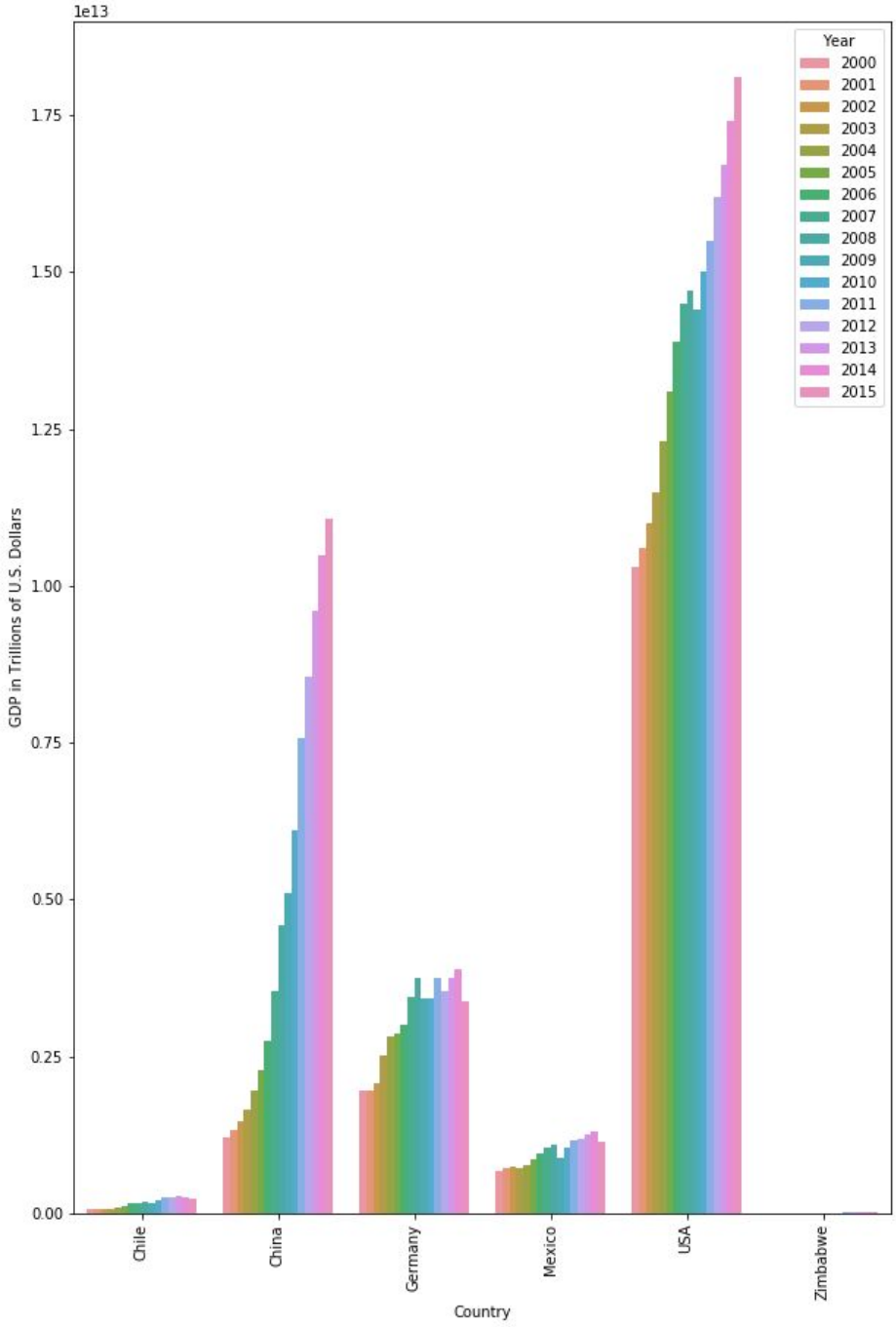
If you remove Zimbabwe from the picture, all of the other countries seem to remain in the top band, that is, even as their GDP changes, their life expectancy remains in a similar. So, at the scale of this graph, it could be argued, that *life expectancy is reasonably independent of GDP*.



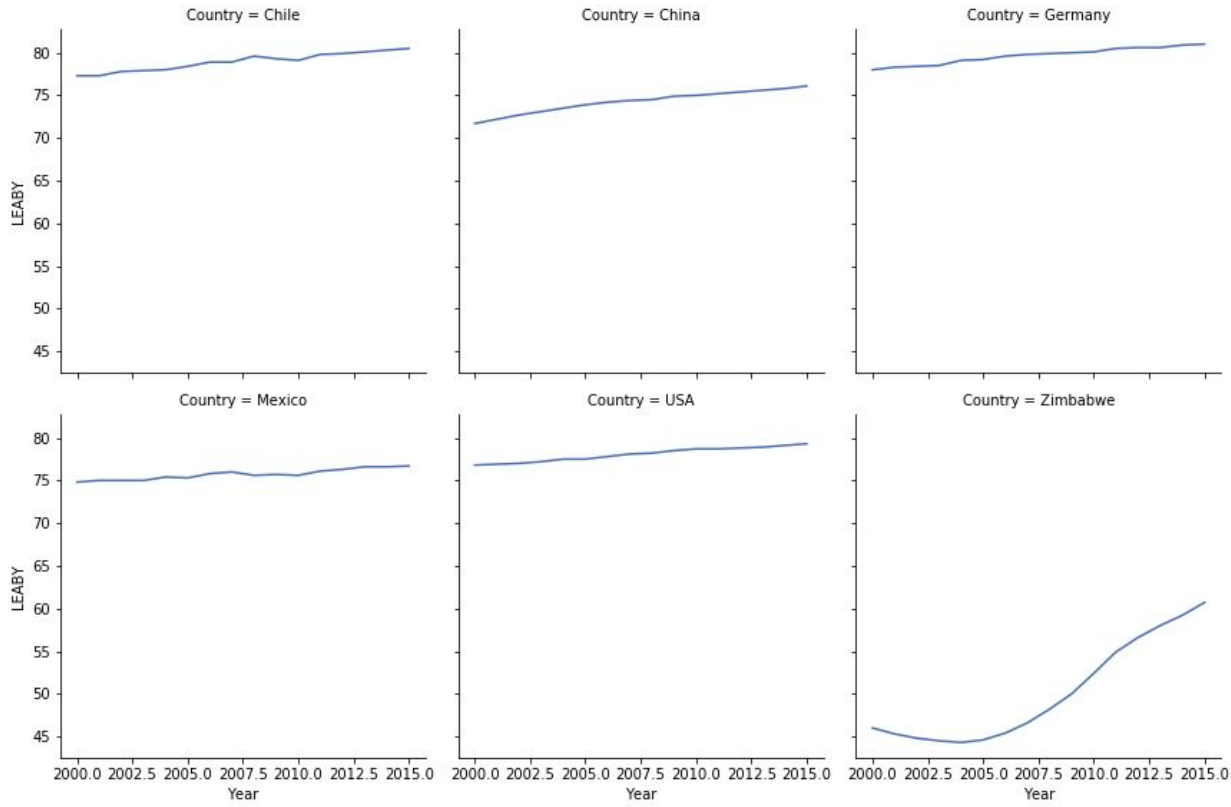
So, let’s take a closer look at GDP change over time for each country. From the graphs below, you can see that both China and the USA have had significant growth.



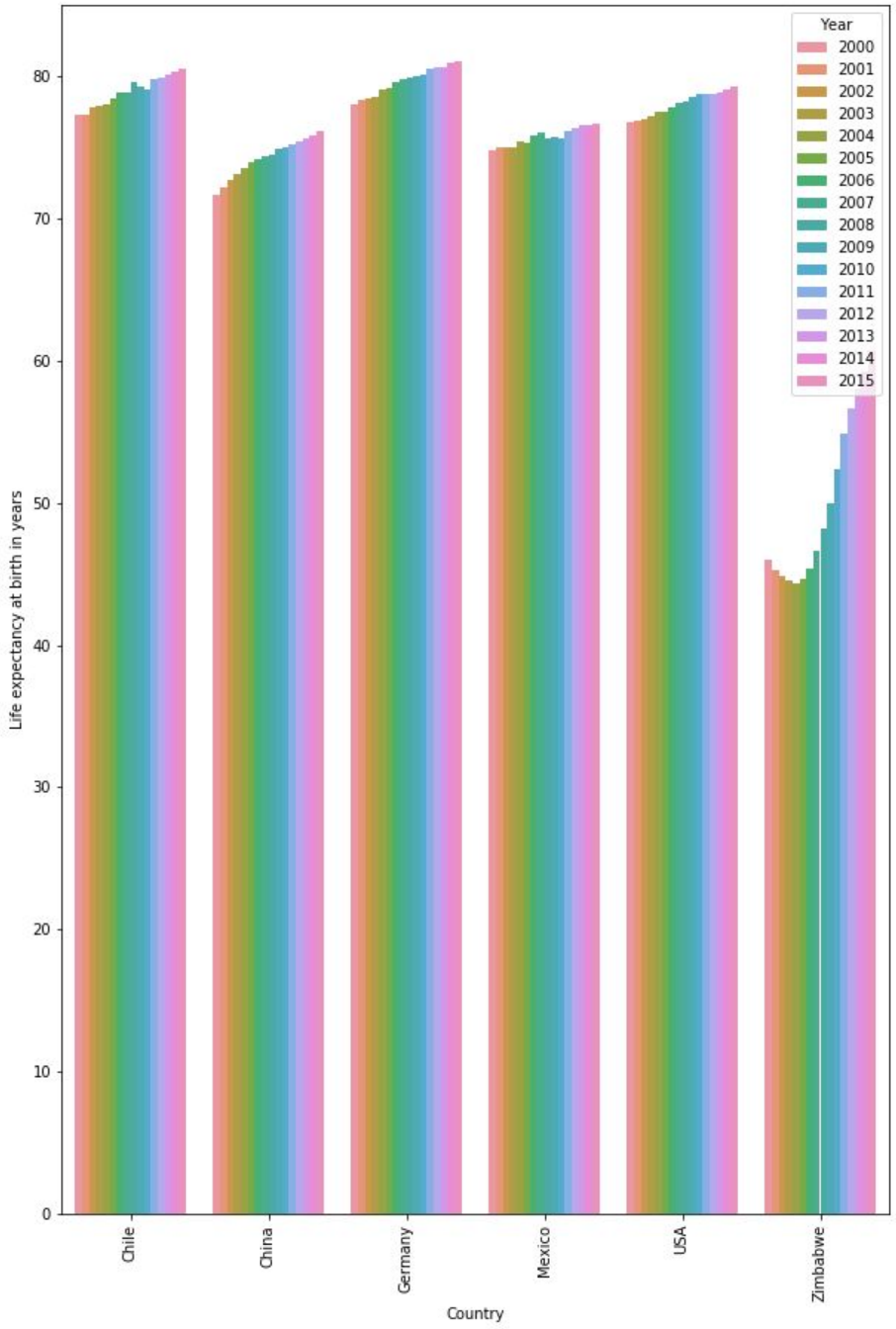
In fact, taking another another view, you can see that all countries have generally experienced GDP growth over time, if you look closely, even Zimbabwe.



And then we can take a look at life expectancy over time. Again all countries seem to have an upward trend.



In the graph below, you can see clearly, that Zimbabwe starts with a minor decline in life expectancy, then similar to the other nations, goes back to an upward trend.



So what can we conclude from all of this? All of the nations investigated are on a general upward trend in both GDP and life expectancy, but the growth rate of the two do not correlate and are not directly related. The one outstanding nation in the statistics is Zimbabwe, which, while it has a similar GDP to Chile, has a significantly lower life expectancy. It is likely that this relates not to its nation's GDP, but to another health related challenge the country faces.