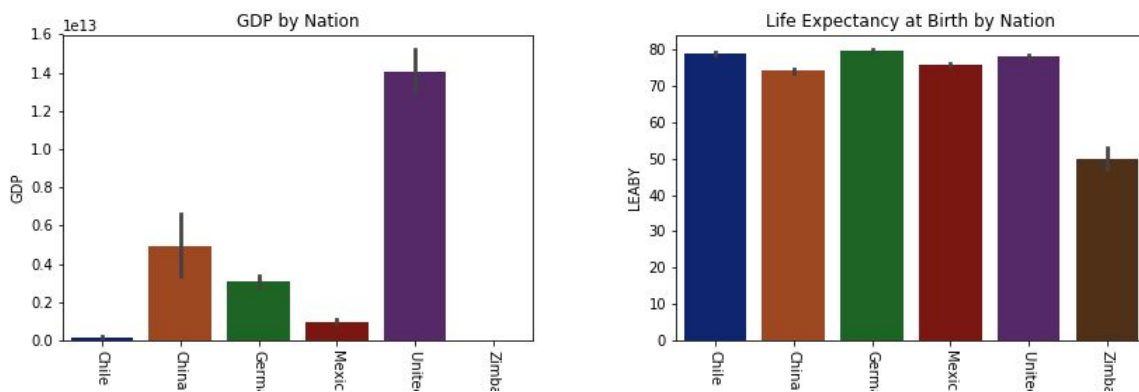


# GDP and Life Expectancy Linked?

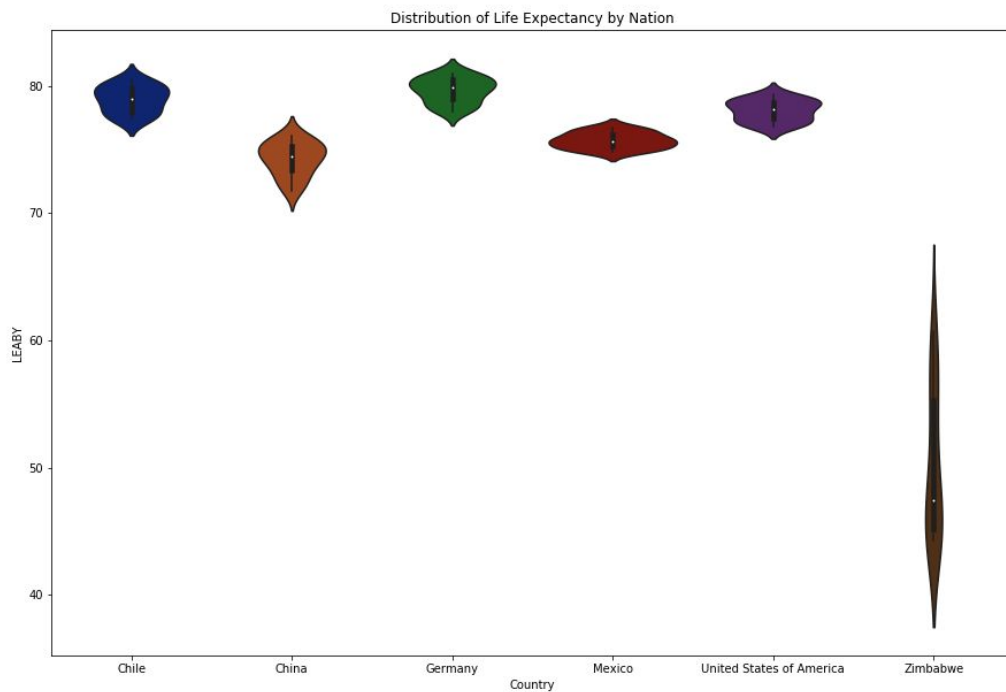
## Probably Not

It's easy to imagine why GDP and life expectancy might have a correlation to one another. [Wikipedia](#) defines GDP, or gross domestic product, as the monetary value of all the goods and services produced by a nation during the course of a year. It seems reasonable to guess that citizens of countries with a higher GDP might have a higher standard of living and therefore have a greater life expectancy - the average number of years a person can be expected to live - at birth.

The actual relationship between GDP and life expectancy seems to be more nuanced than that. The data provided by the World Health Organization for Chile, China, Germany, Mexico, the United States of America, and Zimbabwe between 2000 and 2015 definitely shows some interesting patterns, but they don't exactly suggest a direct correlation between the two variables.

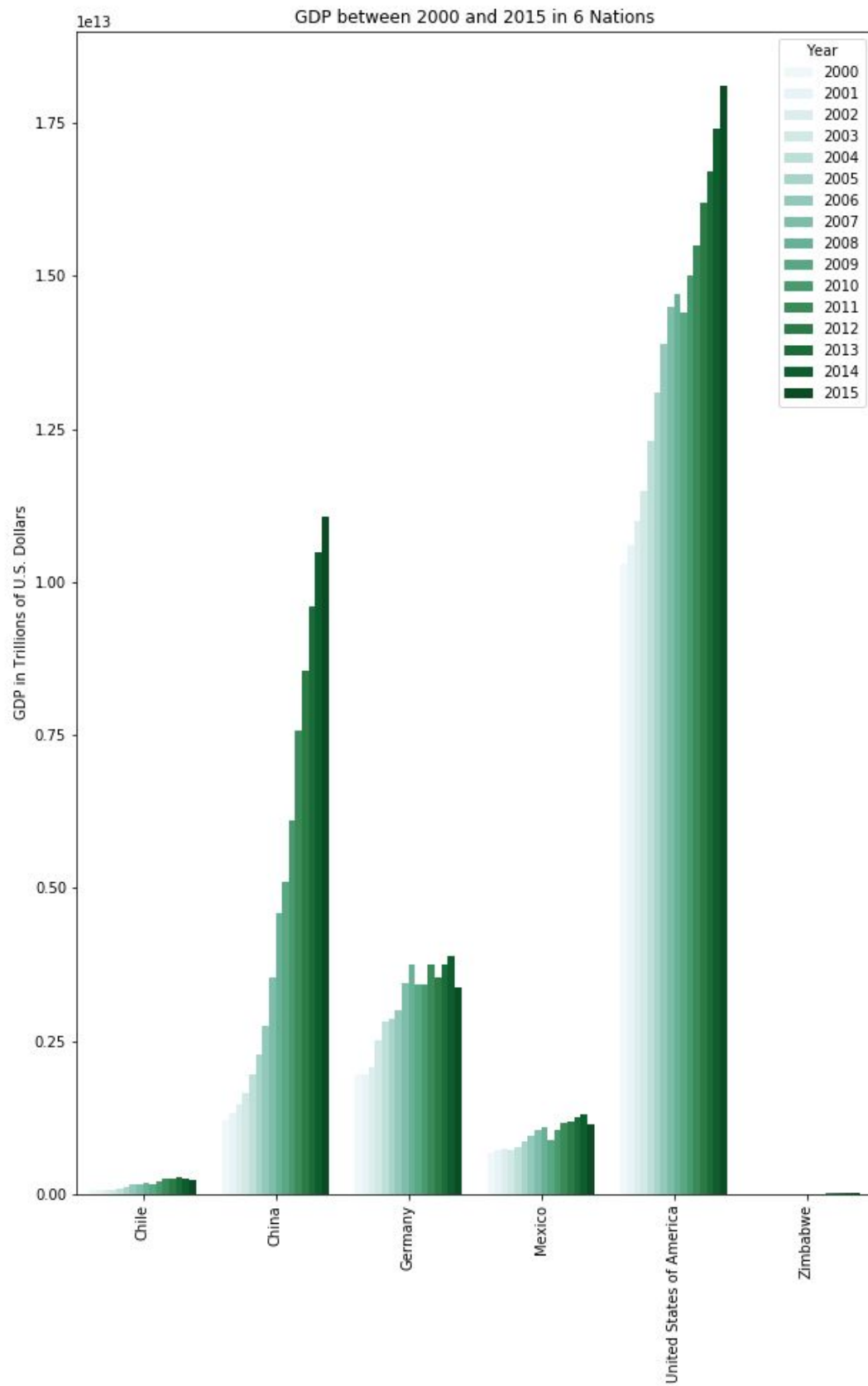


The above bar graphs show the average over the 16 years of GDP in trillions of U.S. dollars on the left and of the life expectancy at birth in years (LEABY) on the right. If greater GDP meant greater life expectancy, then the above bar graphs should look very similar. Instead, Chile, China, Germany, Mexico, and the United States, 5 nations with very different GDPs, all have very similar life expectancies. Zimbabwe, on the other hand, has a significantly lower average life expectancy than these other 5, even though it's GDP is not much lower than that of Chile.

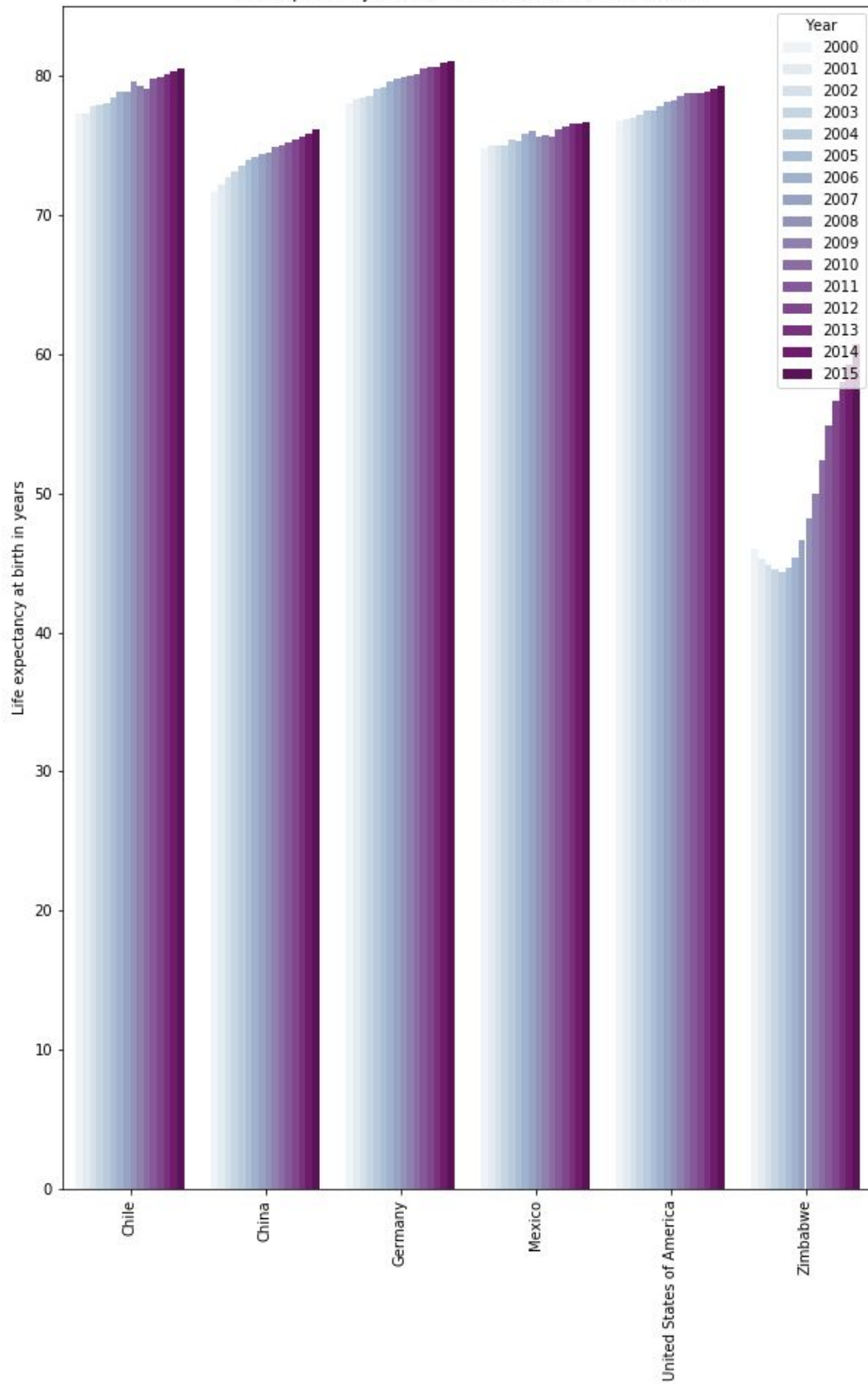


But then this raises the question: why is Zimbabwe's average life expectancy over these 16 years so much lower than these other nations if it's independent of the nation's GDP? The violin plot above gives us a little more information. Not only did Zimbabwe have a significantly lower average life expectancy than the other nations, it was also the only one to exhibit a wide distribution of life expectancy values during the period in question. While the life expectancy values of the other nations stayed within a range of less than 10 years, Zimbabwe's span over 30 years. This further indicates that something very different happened in Zimbabwe than in the other 5 nations between 2000 and 2015.

Zimbabwe's stretched violin plot makes sense considering the longer error bar it had in "Life Expectancy at Birth by Nation". However, China and the United States had relatively large error bars in "GDP by Nation". The graphs below help show why.

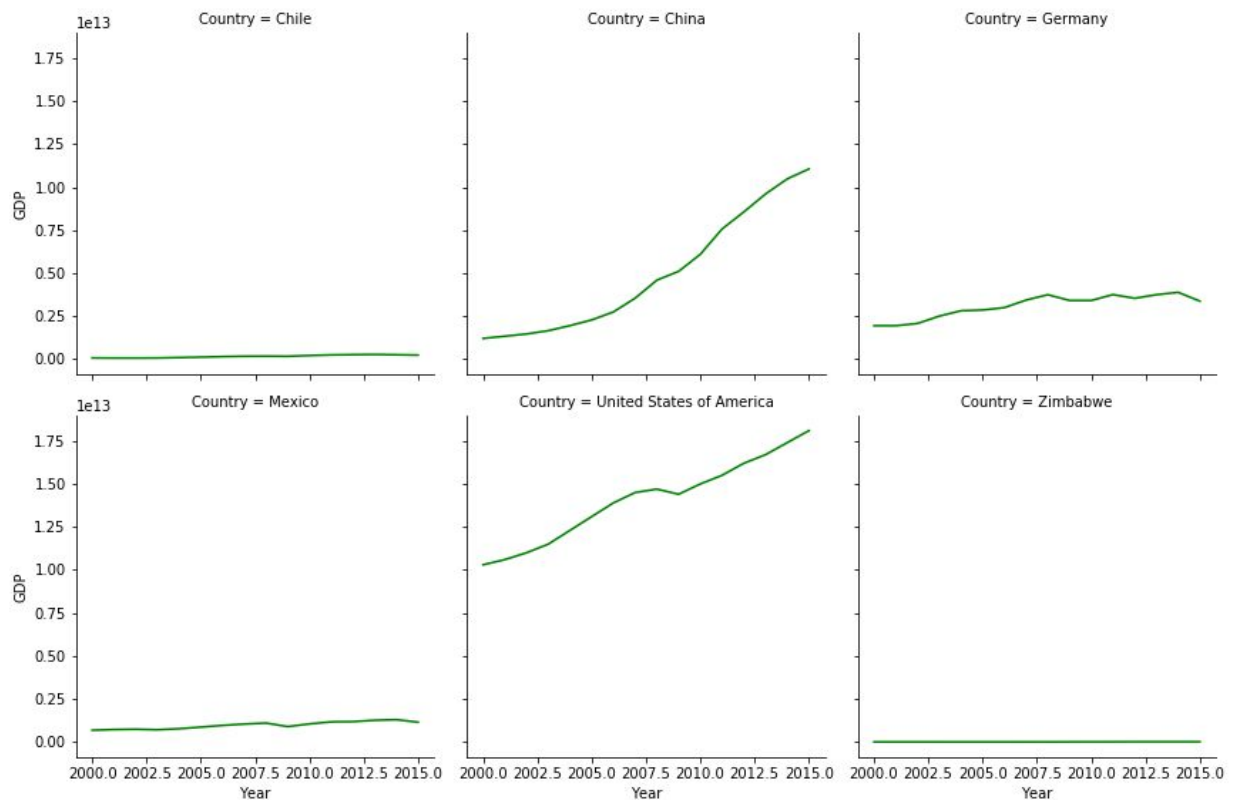


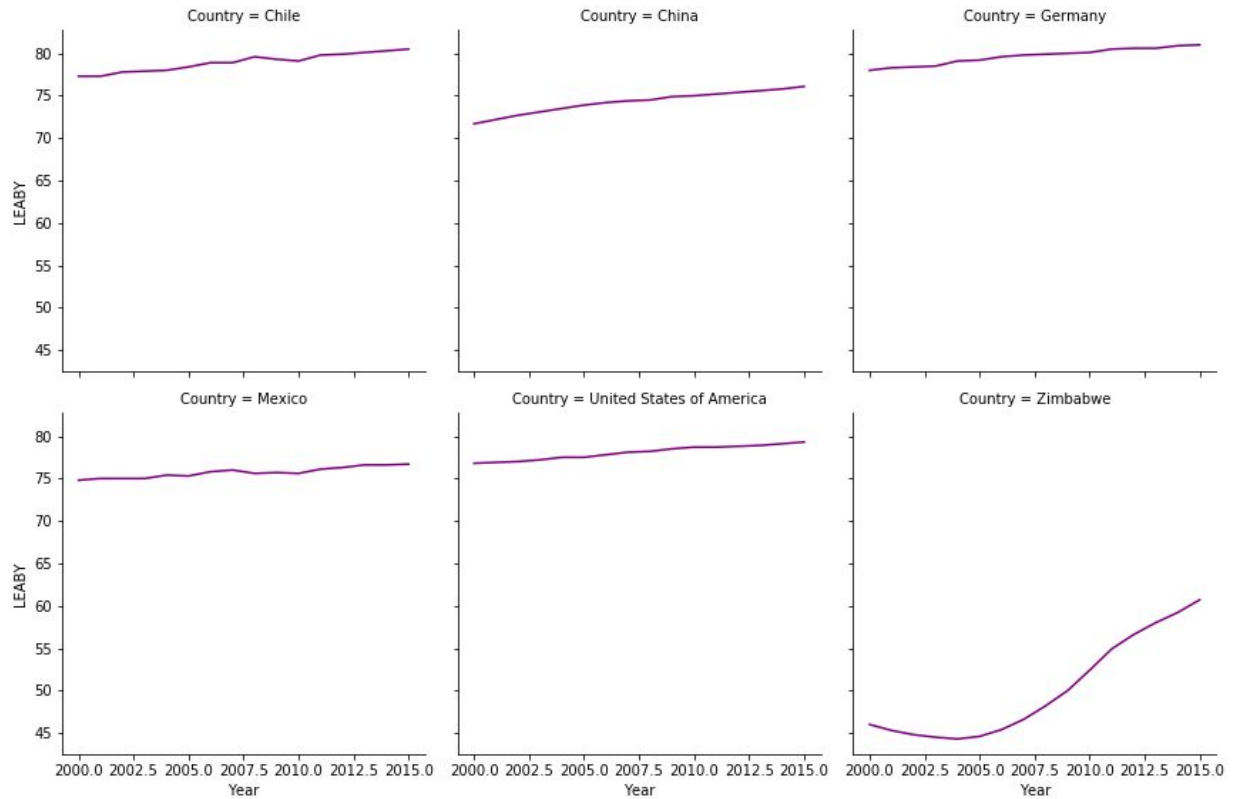
Life Expectancy between 2000 and 2015 in 6 Nations



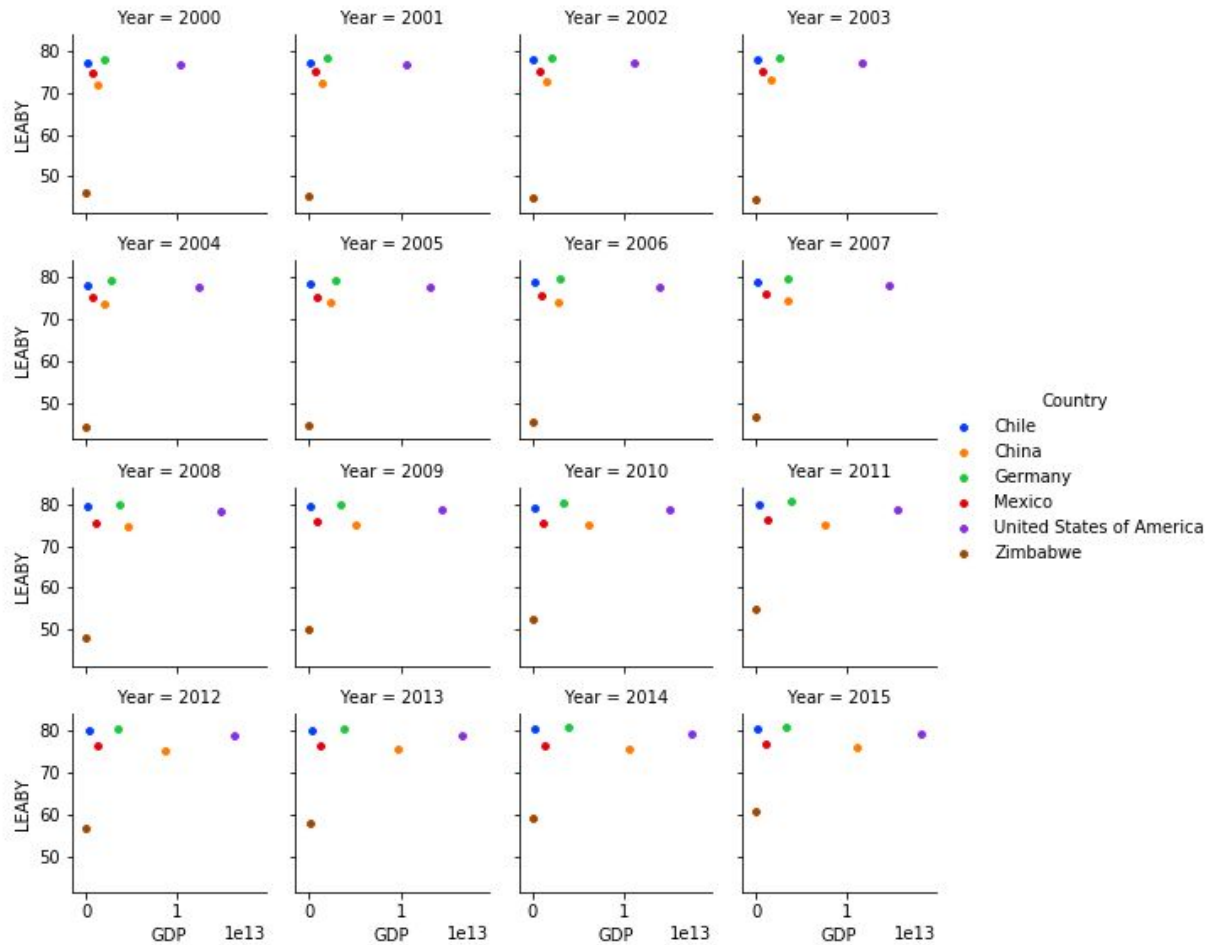
In “GDP between 2000 and 2015 in 6 Nations”, we see that of all the nations, China and the United States had the greatest change in their GDPs. Both nations witnessed tremendous increases in their GDP over these years while the others experienced much smaller increases or no increases at all. “Life Expectancy between 2000 and 2015 in 6 Nations” shows that all but Zimbabwe experienced very similar increases in their life expectancy. Zimbabwe instead experienced a decrease in life expectancy from 2000 to 2004 and then saw a very drastic increase after that. These three instances of drastic change account for the elongated error bars seen in the first two bar graphs.

The line graphs below again present the same data. China and the United States clearly experience more dramatic growth in GDP than the other nations and Zimbabwe experiences a greater rate of increase to its Life expectancy than the other nations. Again, if there were a correlation between GDP and life expectancy, these two sets of line graphs should look very similar. Instead, China and the United States increase notably in GDP and less so in life expectancy while Zimbabwe dramatically improves in life expectancy and doesn’t see much movement in GDP.

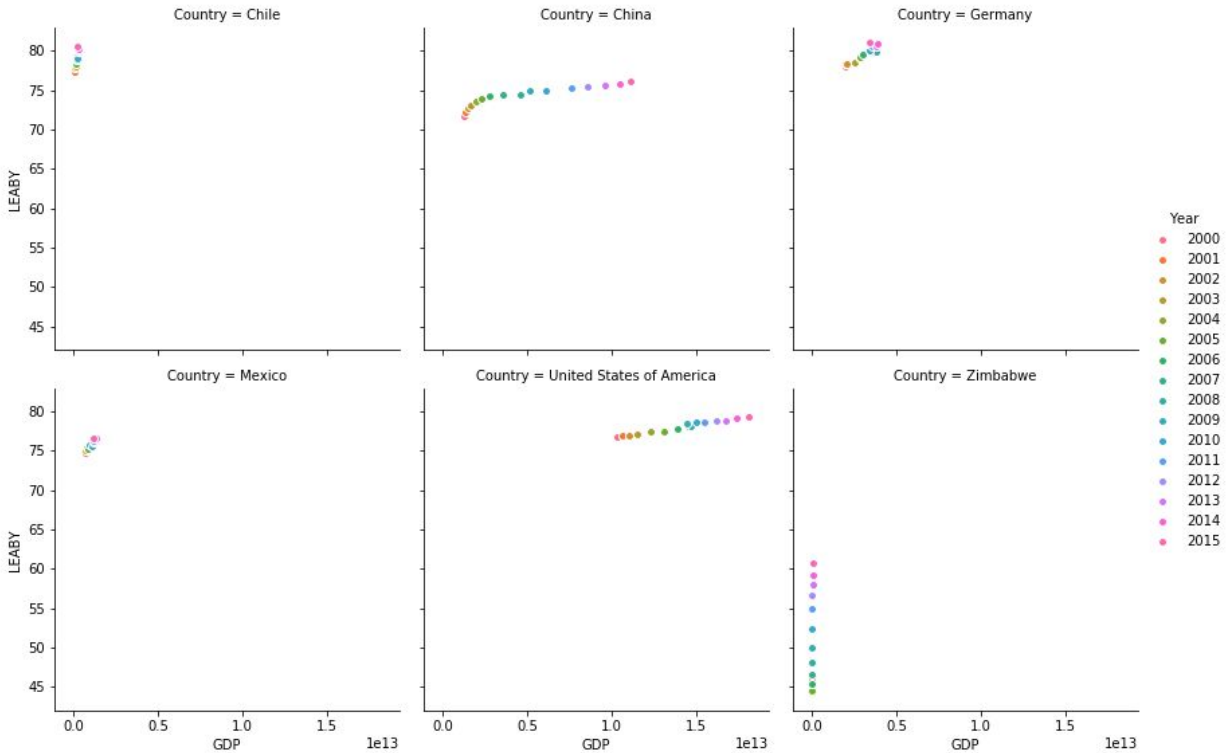




Below, the series of scatter plots finally shows a direct comparison between life expectancy and GDP. The plot for each year shows a smattering of data points without any real pattern or hint of correlation between the two variables. Even as certain colored dots travel across the grid through the years, no immediately obvious pattern emerges.



The below series of scatter plots gives the first real hint that GDP and life expectancy might not be completely independent. The plots isolate each nation and directly compare how GDP and life expectancy changed between 2000 and 2015. Although the trails of data points make different patterns, they all seem to travel in the same general direction: away from the lower left and towards the upper right. Certainly the exact direction and “speed” of each trail is a little different, but the general direction of each is left to right, bottom to top. The implication is that within each nation, as GDP increased, life expectancy also increased.



Of course, this is insufficient evidence, especially considering the lack of supporting evidence in the other charts. There is also so much more data to consider. This was only a sampling of 6 nations of 16 years; looking at more nations over a longer span of time could provide much more insight and more evidence either supporting or disproving correlation between GDP and life expectancy.

There are also other factors at play. Zimbabwe was experiencing a serious [HIV/AIDs epidemic](#) until 2004, which almost certainly contributed to its decreasing life expectancy between 2000 and 2004. With conditions improving, life expectancy was free to increase from then. This event seems to have no obvious ties to Zimbabwe's economy or GDP. China's economy made several changes that likely contributed to its skyrocketing GDP including [switching its focus to developing the service industry and reducing its reliance on exports](#). However, this also seem to have no obvious impacts to the life expectancy of China.

In the end, it seems as though GDP and life expectancy are not related, but more data could further prove or disprove this entirely.





