Do Wealthier Countries' Citizens Live Longer?

By Jason Healey, Aug 2018

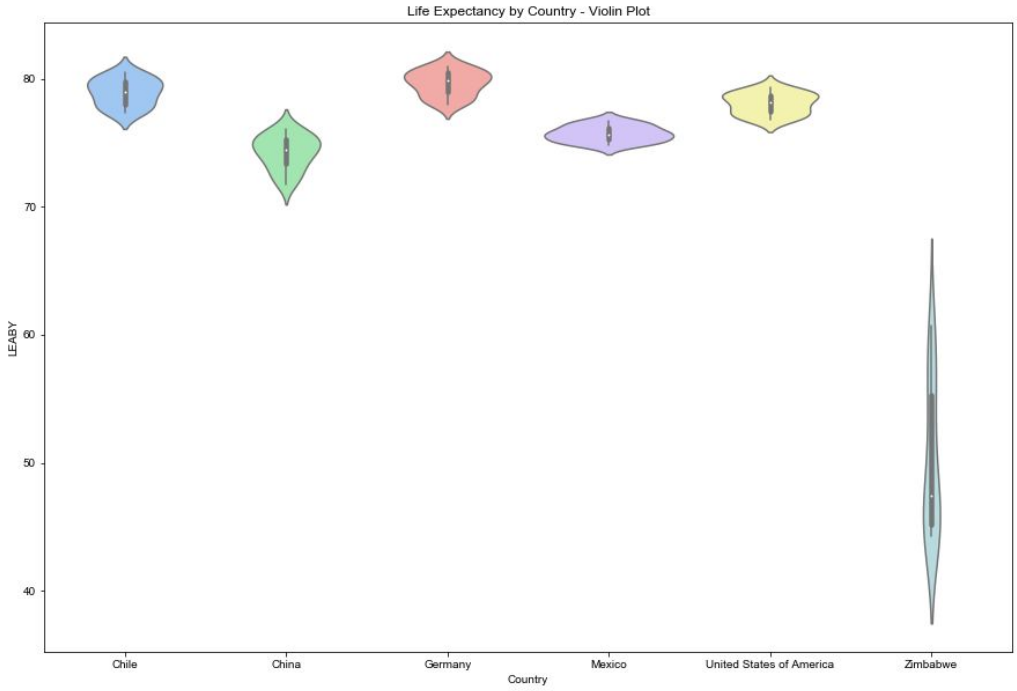
The health of a nation and its people are usually measured based on factors like Gross Domestic Product, and the Life Expectancy at Birth (in Years). Gross Domestic Product (GDP) is the total value of goods produced and services provided in a country during one year. Life Expectancy at Birth in Years (LEABY) is the measure of how long the babies born in that nation can expect to live at the time of their birth.

To take a look at whether GDP, and LEABY are related, we've gathered data from the years 2000 through 2015 from six countries of varying economic development: . We're taking a look at this data to determine if there's a correlation of any kind between a country's economic success, and the length of time its citizens can expect to live.

For this purpose, we are using only the raw data for GDP, and Life Expectancy measured in years, by country and for the stated date range. The GDP data was sourced from the Work Bank national accounts data, and the OECD National Accounts data files. The Life Expectancy data was sourced from the World Health Organization. There are other factors which may play into the values, and we may postulate on what those are during the papers conclusion.

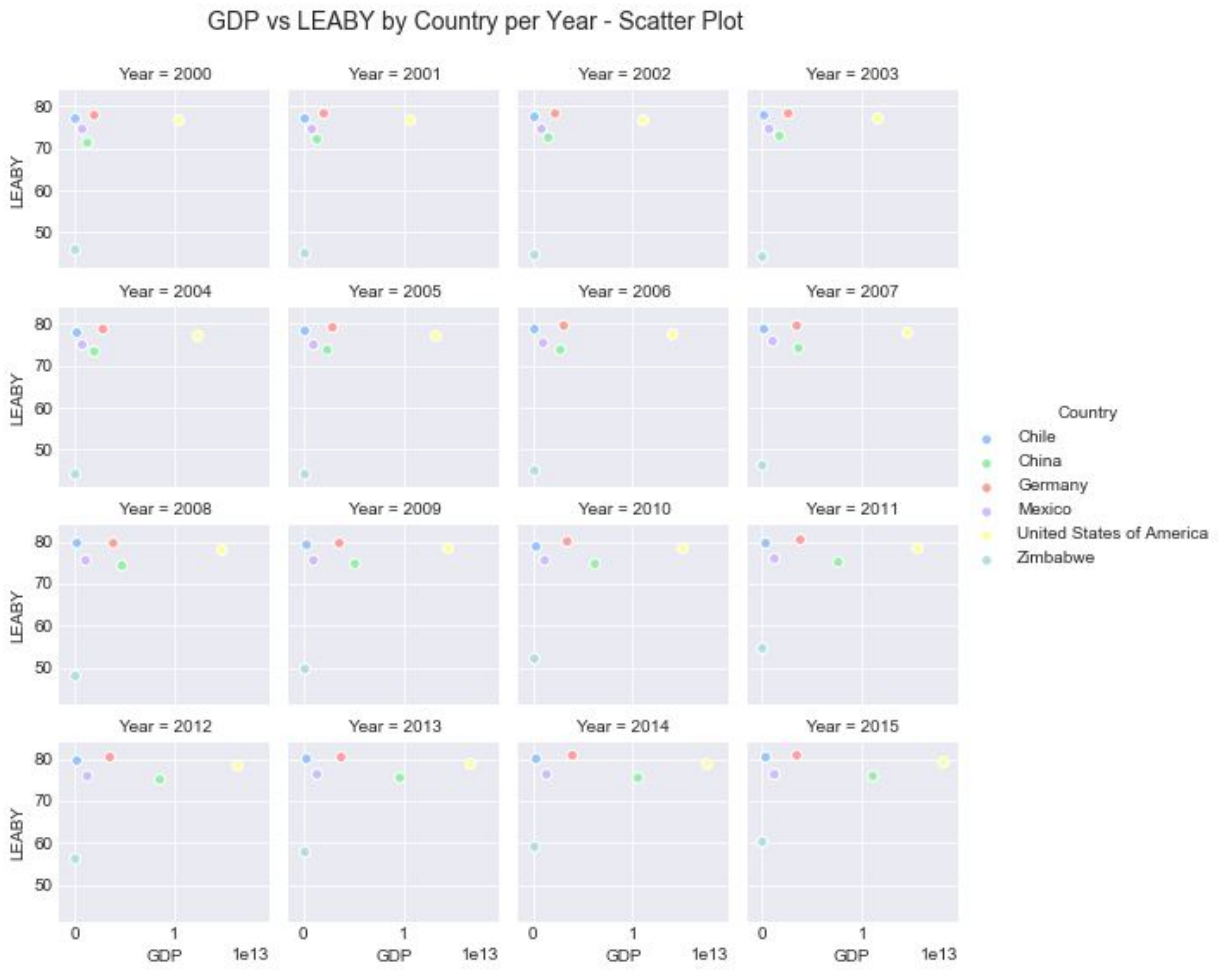
Analysis

We'll first look at the data for life expectancy by using a violin chart of LEABY by Country.



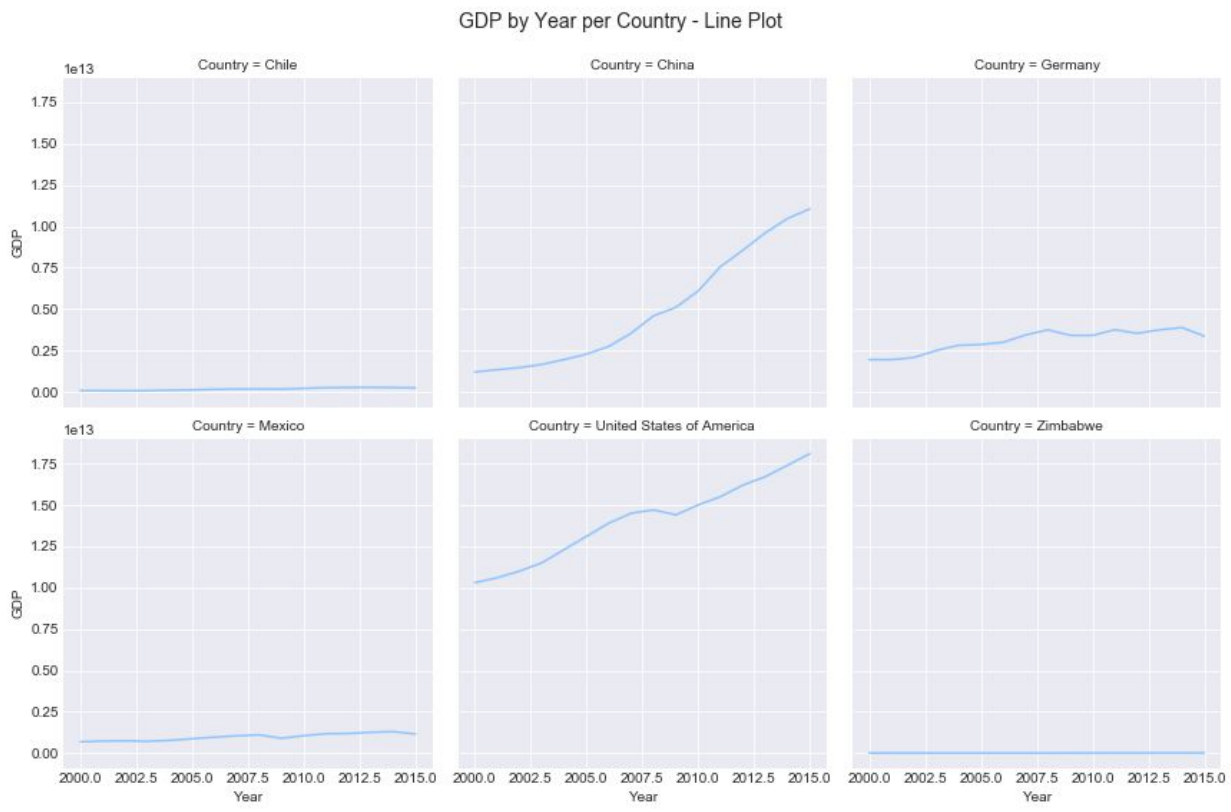
While violin charts can be confusing at times, one of the striking items to take away is how similar five of the six countries appear to be. Zimbabwe is a clear outlier of Life Expectancy changes over time. It's long plot shows that there was a great variance between its low and high points over the sixteen years this data encapsulates. Some other takeaways show that the average life expectancy in five of the nations are between 70 and 80, with Zimbabwe at some point touching that bottom of that range.

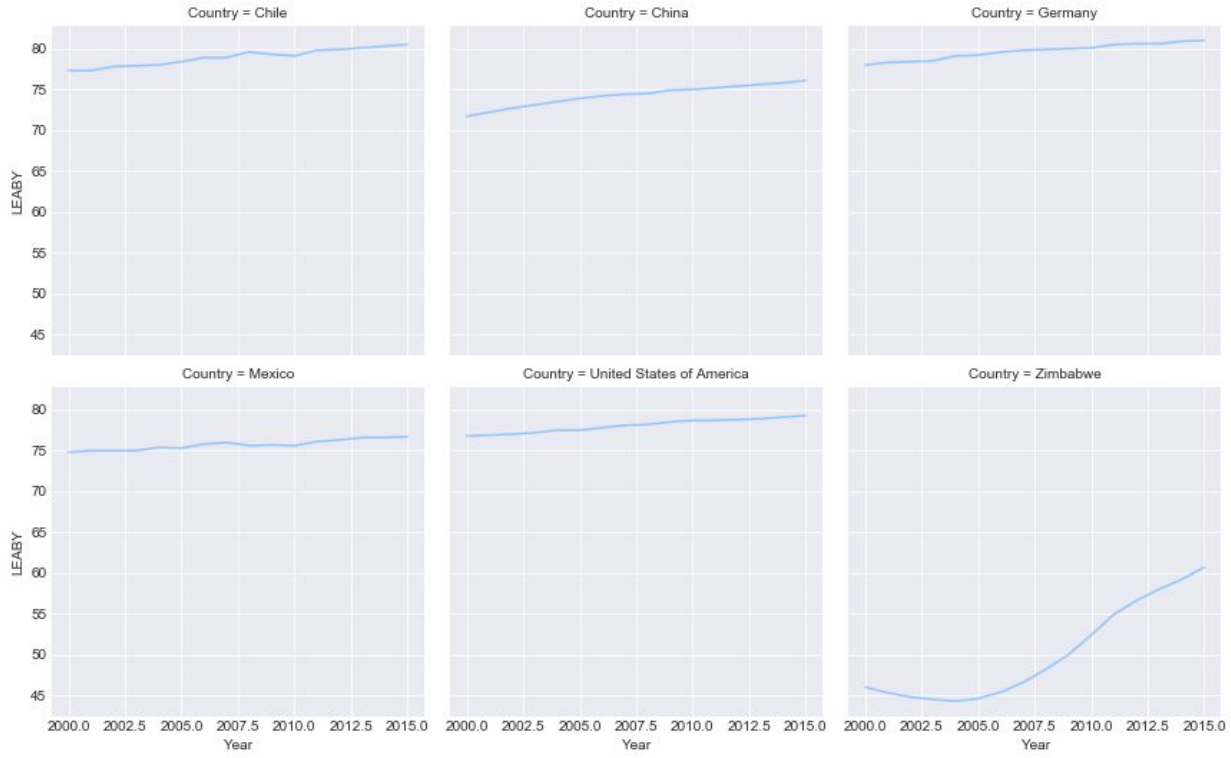
To get a better look at this data as it relates to time and GDP, we'll take a look at a scatter graph of GDP vs Life Expectancy, by Country, with one graph per year.



Notice here the rightward, or positive, GDP movement by China in the bright green, and the US in the yellow. Three of the four remaining countries also had positive GDP growth but Chile's was minimal. Lastly, notice the complete lack of positive GDP growth by Zimbabwe. During all of this GDP movement, the LEABY, or Life Expectancy at Birth in Years, of all nations rose vertically, but not proportionally to their GDP growth. Zimbabwe, in fact, made tremendous gains in life expectancy, though it remains the lowest in that measurement.

The next two graphs are fairly self explanatory. These are line graphs showing the trend by country over time for GDP and then LEABY.


GDP by Year per Country - Line Plot
Country = Chile
Country = China
Country = Germany
Country = Mexico
Country = United States of America
Country = Zimbabwe
1e13
GDP
Year
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2000.0
2002.5
2005.0
2007.5
2010.0
2012.5
2015.0


LEABY by Year per Country - Line Plot
Country = Chile
Country = China
Country = Germany
Country = Mexico
Country = United States of America
Country = Zimbabwe
LEABY
Year
45
50
55
60
65
70
75
80
2000.0
2002.5
2005.0
2007.5
2010.0
2012.5
2015.0

Note the strong GDP growth by China and the US, and the flatline and near flatlines of Zimbabwe, and Chile, respectively. However, in the LEABY chart, you can clearly see that the average age of death shown by LEABY increased most for China, but Chile, Germany and the US had solid gains. Mexico was on the lower side of overall gains. ZImbabwe on the other hand, had a period of decline, unexplained by GDP, but then an enormous period of growth in the years since around 2004.

Also of note, the countries with the highest GDPs do not have the highest life expectancy. Germany is the highest LEABY value, but it's behind both China and the US in this study. While Zimbabwe does come in at the lowest GDP by far, possibly correlated with its lowest of the LEABY scores, Chile's GDP is lower than that of Mexico, yet its LEABY is superior in absolute value and growth over time.

Conclusions?

The sample of data above doesn't have a lot of correlation between the increase of GDP affecting life expectancy to a large degree. China and the US, where GDP increased the most, had their Life Expectancy rise, but the life expectancy of all countries within the study rose. Chile and Zimbabwe's GDP increases were minor over the same period, and yet Zimbabwe's Life Expectancy rose tremendously after plummeting in the early 2000s.

Other factors must be affecting this data to a larger degree than GDP. Some such factors may include available health care, social conflict, and crime. An analysis of those measurements are needed to best determine the greatest factor, as well as a cross-comparison to GDP.