GDP and Life Expectancy Relationship Study between 6 Countries

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The below is a study conducted on the GDP and Life Expectancy of 6 Countries: Zimbabwe, China, US, Chile, Germany and Mexico. We will use different types of plots to represent the data, dissect the data, and talk about how well each type of graph represents the data.

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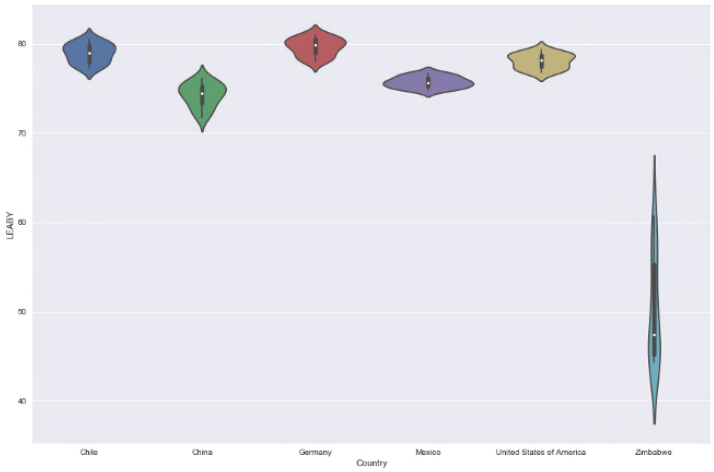
The study was done over a period of 15 years (2000–2015) using data World Bank national accounts data, and OECD National Accounts data files and Life expectancy Data Source from the World Health Organization.

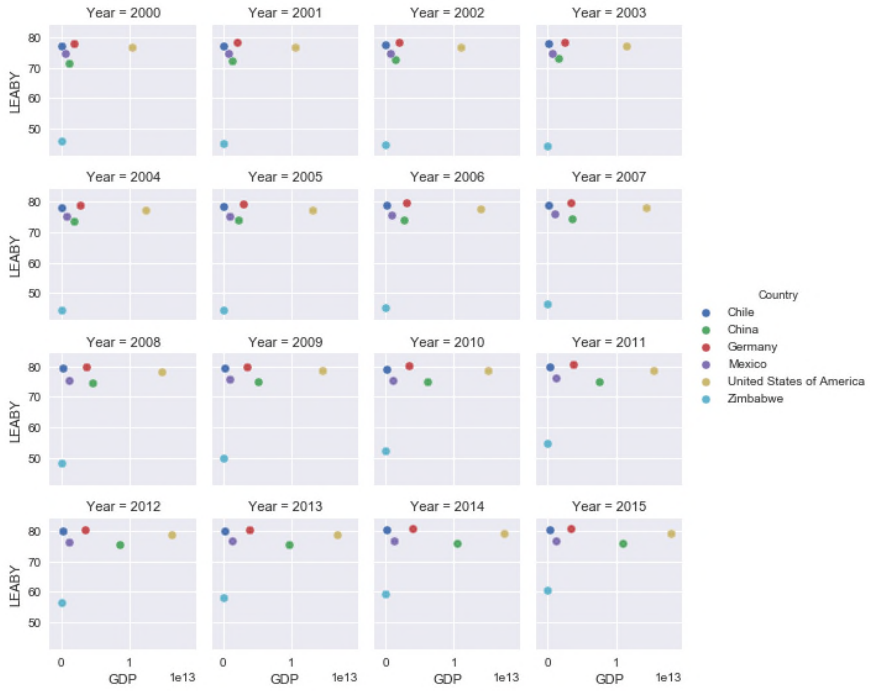
The attempt of the study is to, without any regression analysis, attempt to determine any relationships between life expectancy in a given country with their GDP, and determine possibly causation for the changes.

To start, let's look at the below Violin graph of the Life Expectancy by country of over the 15 year period. The Violin chart is nice in that it is able to show a lot of data in a chart, data that isn't captured in a line graph or bar-chart. For those who may not know, a **white dot** represents the median. The **thick black line** in the center of each violin represents the interquartile range. The **lines that extend from the center** are the confidence intervals—just as we saw on the bar plots, a violin plot also displays the 95% confidence interval.



To use Zimbabwe as an example, the median life expectancy in the country (again, represented by the white dot) is around 48 years, but has a very large deviation from the median, represented by the shaded blue areas. What the violin plot does not do well is show changes over time. We have no idea looking at this chart if Zimbabwe's life expectancy has gotten worse or better over time.

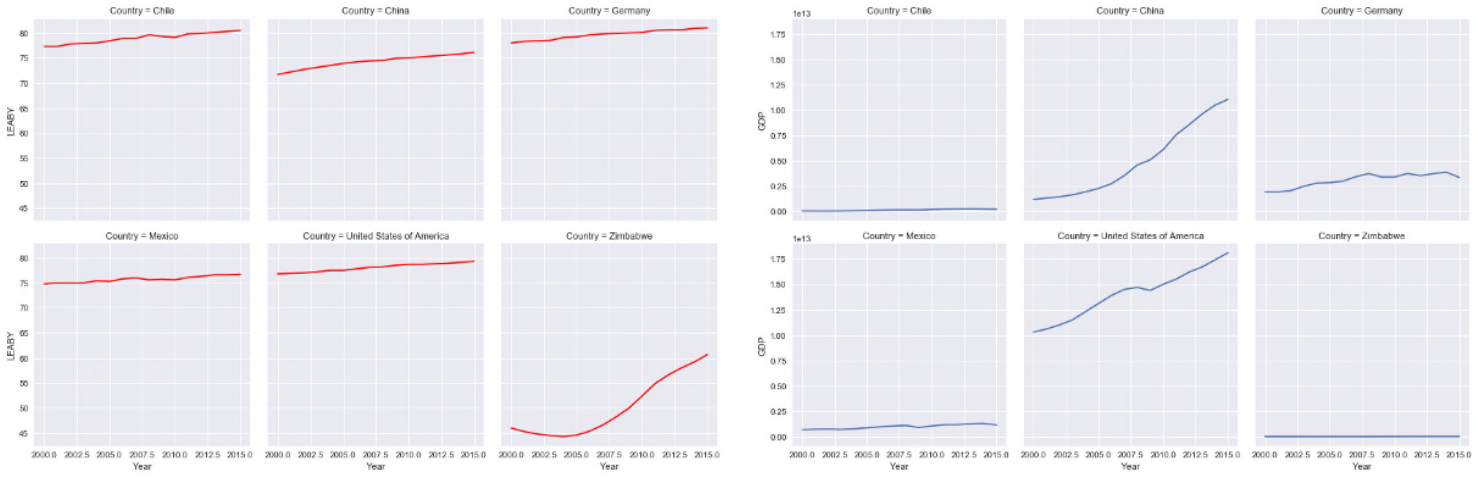
Now we'll look at a a scatter plots for each country in which GDP is mapped as a function of life expectancy.



The scatter plots (through plotting 1 for each year) does exactly what the violin chart does not, shows the change in time for life expectancy, as well as GDP. In the violin plot, we could see that Zimbabwe's median life expectancy was around 48 years, but we could not see if that was getting worse or better over time. The scatter plot does a nice job showing that while Zimbabwe's life expectancy in 2000 is around 45, by 2015 they've gown to 60, which is big change, the biggest, percentage wise, of all the countries.

If we wanted to dive in on this, we know that Zimbabwe's economy takings a turn for the worse in 2000 with a massive increase in poverty. The country experiences hyperinflation and even suspends their own currency. It's not until 2009 does the country have it's first growth year in terms of GDP. This is well documented in the scatter-plot, that despite the fact that life expectancy is headed in the right direction, there is virtually no change in GDP over the 15 year window.

Lastly, we will look at line graphs that independently plot GDP and Life Expectancy over time and take a look at China's Economy over that time frame.



Left shows Life Expectancy by Country over 15 year window. Right shows GDP by country

The line graph (along with bar chart and pie chart) is probably among the most recognizable and easy to read charts there is. What stands out the most about GDP change over time is China over the 15 year window. In 2000 China has a GDP below Germany and not much

greater than Mexico's but by 2015 China's is nearly 3 times Germany's, and not far off from the US'.

There are many articles written and studies by people who have a much more extensive know base than I about China's rapid rise as a economic powerhouse on the world stage, but we can take a very high level over look at some of the reasons China has seen such a drastic increase.

First and foremost, China's labor laws are far less strict than much of the developed world, allowing them to produce good and services at a much cheaper cost than many other developed nations, giving them a major economic competitive advantage. China is the world's largest exporter in terms of nominal goods, and does so in some questionable ways. One example is China's central bank (similar to the Fed in the US)keeps the USD/CNY to a level such that it is more making it economically sensible (cheaper) for countries and companies to outsource a lot of their production of goods to China vs doing the production domestically.

China has also taken advantage of the technology boom over the past 20 years. China has some of the largest technology firms in the world (Alibaba), as well as 2 of the largest energy / oil firms in the world.

Also, and possibly the biggest factor in this is China joining the WTO in 2001, giving it access to many trading partners it did not have in the past, allowing it to become the economic powerhouse we see today.

I hope you've enjoyed this quick blog post, and that is has been informative for you!