The Effect of GDP on Life Expectancy

By David Vigilante

Introduction

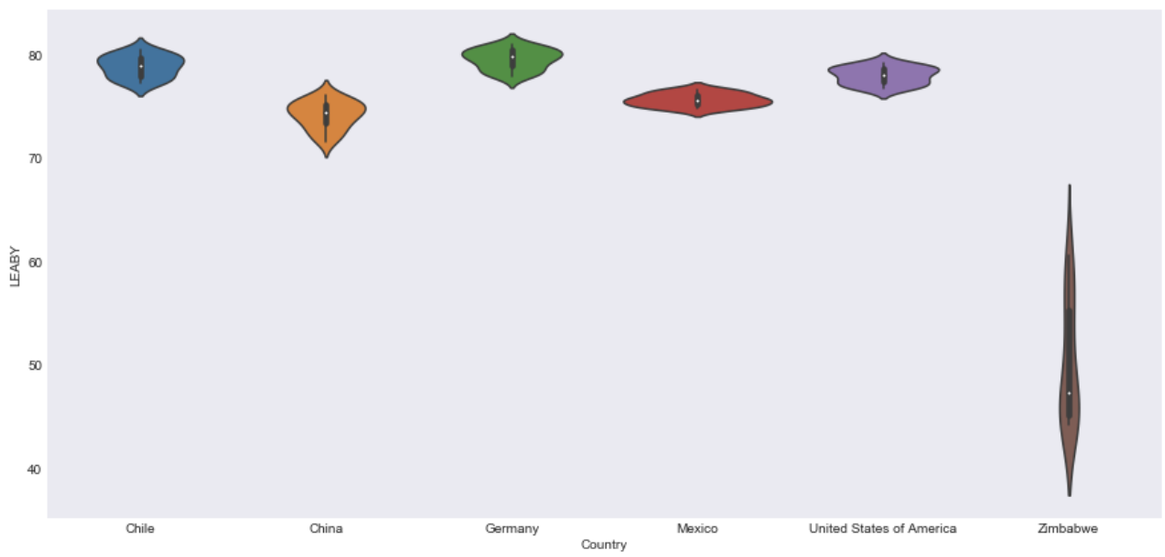
Welcome back to analytics with David! In today's blog post we have analyzed the correlation of a country's GDP and its life expectancy at birth from 2000 - 2015 for six counties. Be warned, you may find the below results surprising!

Background

Gross Domestic Product (GDP) is the total value of goods and services produced in a country during a given year. This metric is often used to as a proxy for the economy activity and productivity for a country. As GDP increases, it is typically thought that the average person in that country will be in a better economic position. We compared this to life expectancy at birth (years) (LEABY). LEABY is a measure of the average age, in years, that an infant will live to if born in a given year for a particular country. In my analysis below I compare the two to see if they are correlated. The sources for these data sets are the World Bank National Accounts and OECD National Accounts for the GDP information and the World Health Organization for LEABY data.

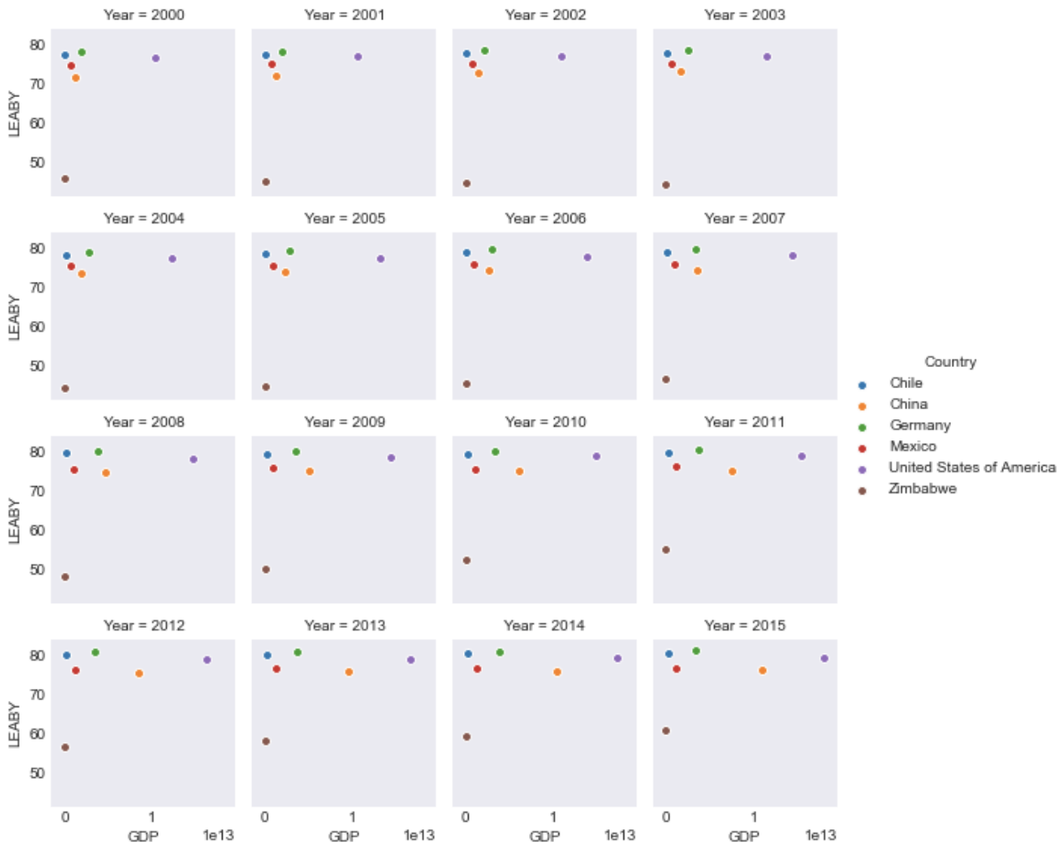
Analysis

Violin Graph of LEABY by Country



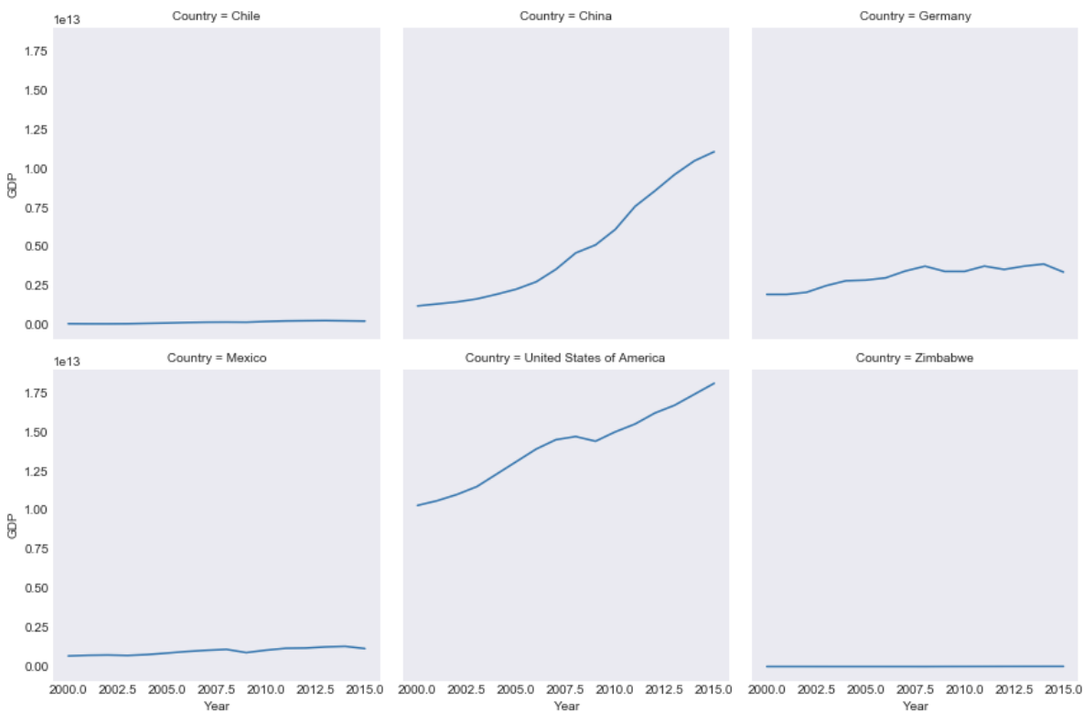
Does it get any better than graphs, musical instruments and insightful analysis? I don't think so. In the above beautiful violin graph we are able to see the distribution of the LEABY for each of the countries as well as the mean and standard deviations. Of particular interest in the long skinny fellow on the right, representing Zimbabwe. The skinny tall nature of the graph indicates that there was a great amount of change over the course the 15 years in Zimbabwe's LEABY. Compared to the other countries, which demonstrate a much tighter distribution, Zimbabwe had the greatest change in its LEABY.

GDP as a Function of LEABY per Country By Year



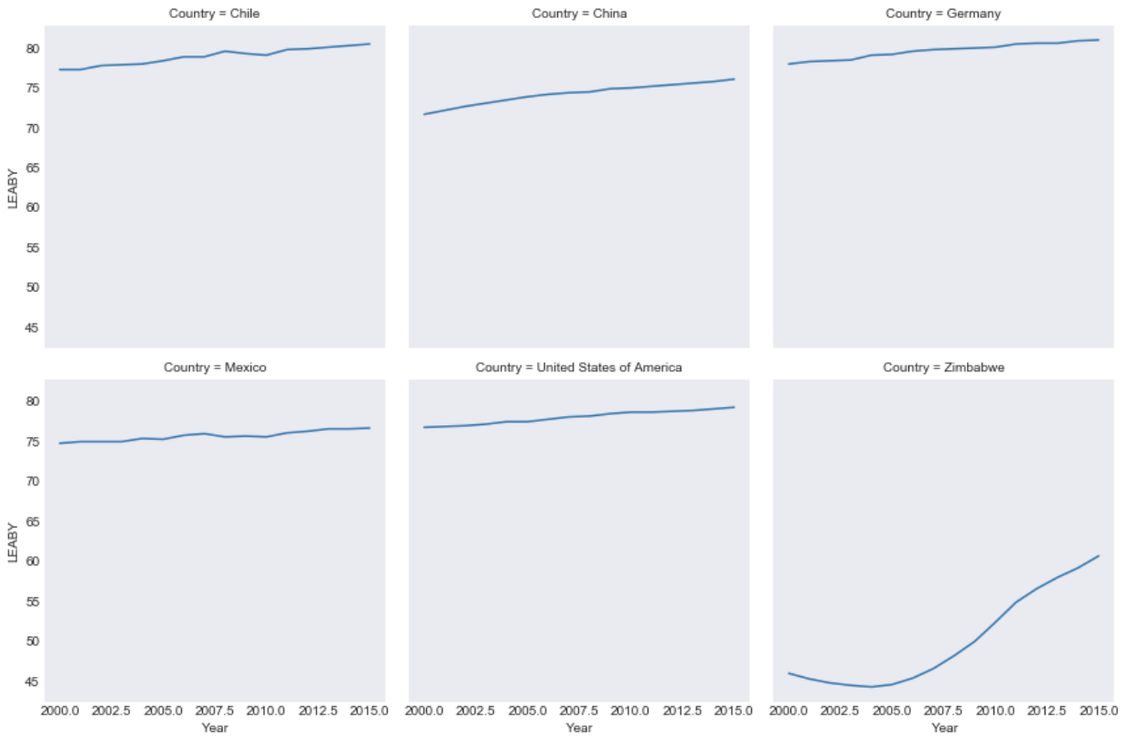
As we dive deeper into our analysis we look at the correlation of GDP and LEABY. If the two variables were positively correlated, as a dot moves further up on the x or y axis it would move up on the other axis as well. The dots of most interest to look at across the years are Zimbabwe, China and the US. We can see Zimbabwe (in brown) move up from the bottom left hand corner to the middle of the y axis on the left hand side, particularly in years 2008 - 2015. There is little movement on the x axis while there is a great change in the y axis, indicating that the increase in the LEABY was not driven by an increase in GDP. China on the other hand moves across the x axis while only slightly increasing in the y axis. While this indicates a positive correlation between the two variables, we would expect a larger increase in the LEABY due to the large increase in GDP. Similar to China, the US moves across the x axis as GDP increased and only slightly increased on the y axis.

GDP per Country from 2000 - 2015



This chart shows in more detail the increase in GDP over time for each of our six countries. Both China and the US demonstrate a large increase in their GDP. Germany displays a modest increase in its GDP, while the other countries have relatively flat GDP increases.

LEABY per Country from 2000 - 2015



This chart shows in detail the increase in LEABY over time for each of our six countries. Zimbabwe shows an incredible change in its LEABY, going from 46 years on average to almost 61 years on average. This is in stark contrast to its flat lined GDP growth. China shows a modest increase in its LEABY. However most of the other countries have a very limited increase in their LEABY.

Conclusion

In conclusion it appears that GDP and LEABY is not very correlated! While there are some upward trends between the two, particularly in China and the US, the majority of the data does not signify a significant degree of correlation. Zimbabwe is clearly an outlier that shows LEABY is not driven by GDP, especially for a country that has a relatively very low LEABY to begin with. This can be due to a number of reasons including that basic health practices and medication available in countries with higher LEABY can be provide to Zimbabwe cheaply or even for free, increasing the LEABY without being driven by GDP. Additionally, Chile and Germany have similar LEABY but very different GDPs. In fact, Germany has the highest LEABY followed closely by Chile. While Germany has the third highest GDP, Chile has the second lowest. Therefore it is hard to establish a correlation between GDP and LEABY.

There are some limitations to the analysis done in the blog post. The main limitation is that LEABY is a per capita metric while GDP is an aggregate. To better analyze the effect of economic growth and LEABY, it would be better to use GDP per capita. On a per capita basis the GDP could look very different and tell a different story. In future research the data would need to be more standardized to omit other factors such as population, macroeconomic event and conflict.

Next week join me to analyze where I fell on the Ballmer Curve while compiling this blog post and if I overshot the peak or hit it just right.