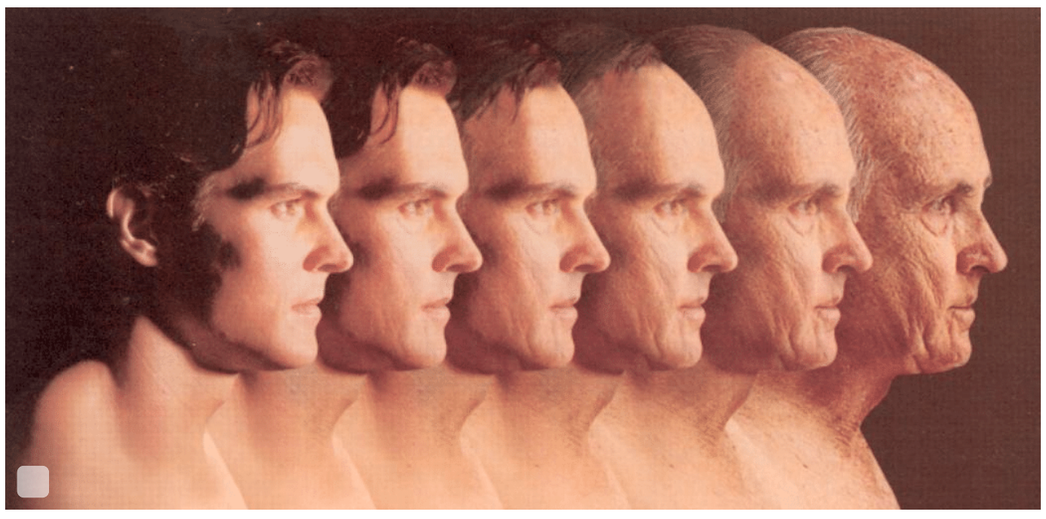


How big is the impact of GDP on life expectancy?

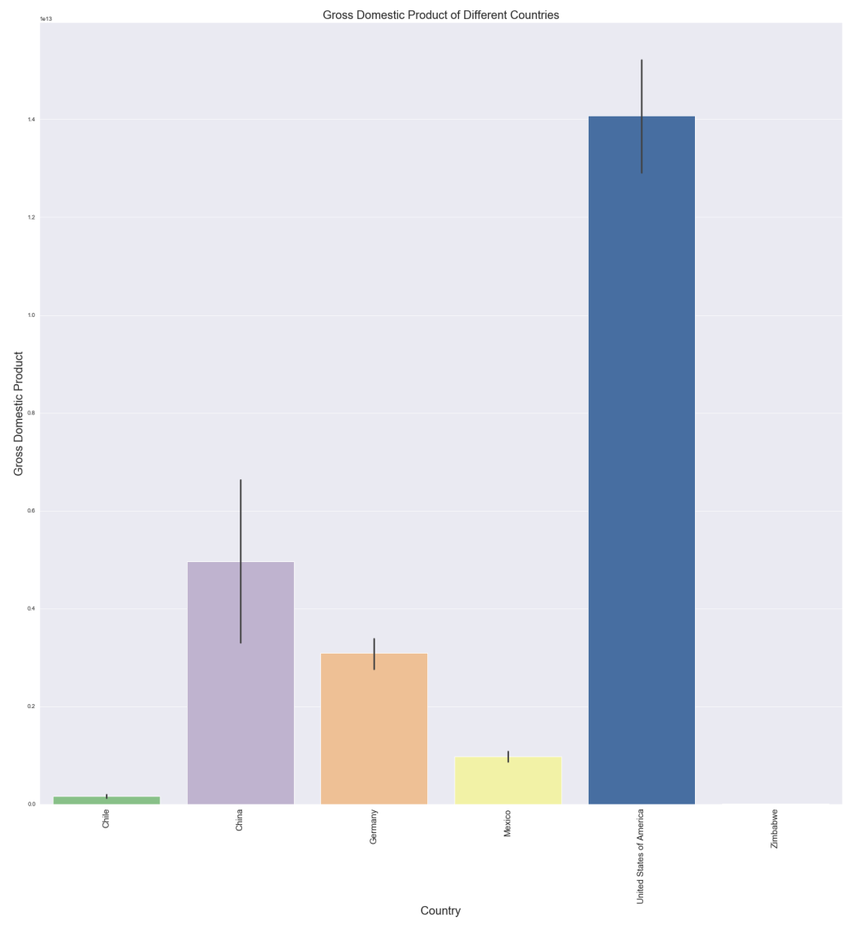
January 22, 2019 Slava Tkachenko, Codecademy

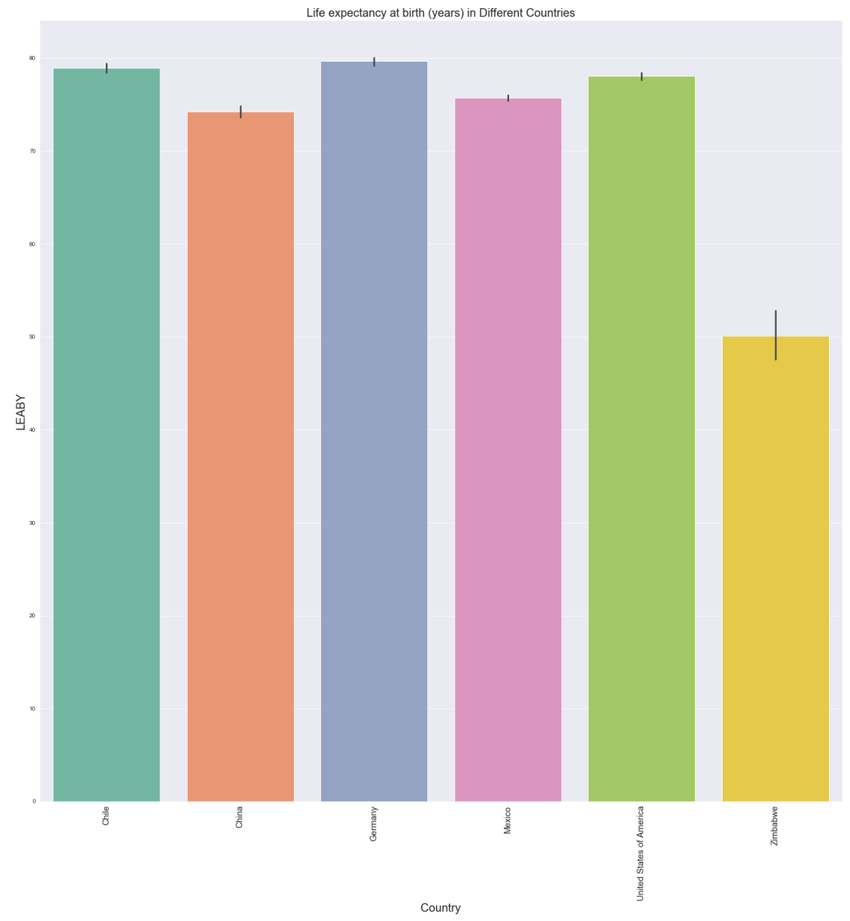
We love juxtaposing things. We are trying to find a connection between obvious and non-obvious things. For example, GDP (gross domestic product) is associated with the economic power of the country. And we associate the level of the country's economic development with life expectancy(LEABY, Life Expectancy at Birth). If we take two diametrically opposed, in terms of the country's economic development - Germany and Zimbabwe, we will see that the level of GDP is significantly different. The same big difference we will see in life expectancy. But is it that obvious?

I have decided to analyze some data and try to find dependancy between GDP and LEABY. Before we jump to it, lets give explanation what is GDP and LEABY. Gross Domestic Product, according to our beloved Wikipedia, is a monetary measure of the market value of all the final goods and services produced in a period of time. Life Expectancy at Birth is the age to which a person is expected to live. The data is sorted by countries, which include Chile, China, Mexico, USA, Germany and Zimbabwe. Here is a data, that we are going to work with:

Country	Year	LEABY (years)	GDP (billion, USD)
Chile	2000 - 2015	77.3 - 80.5	77 - 425
China	2000 - 2015	71.7 - 76.1	2113 - 10647
Germany	2000 - 2015	78.1 - 81.3	949 - 3756
Mexico	2000 - 2015	74.8 - 76.7	683 - 1152
USA	2000 - 2015	76.8 - 79.3	10003 - 18100
Zimbabwe	2000 - 2015	46.0 - 60.7	6 - 16

Let's visualize our data to take a first high level look at both datasets - GDP and LEABY by country.

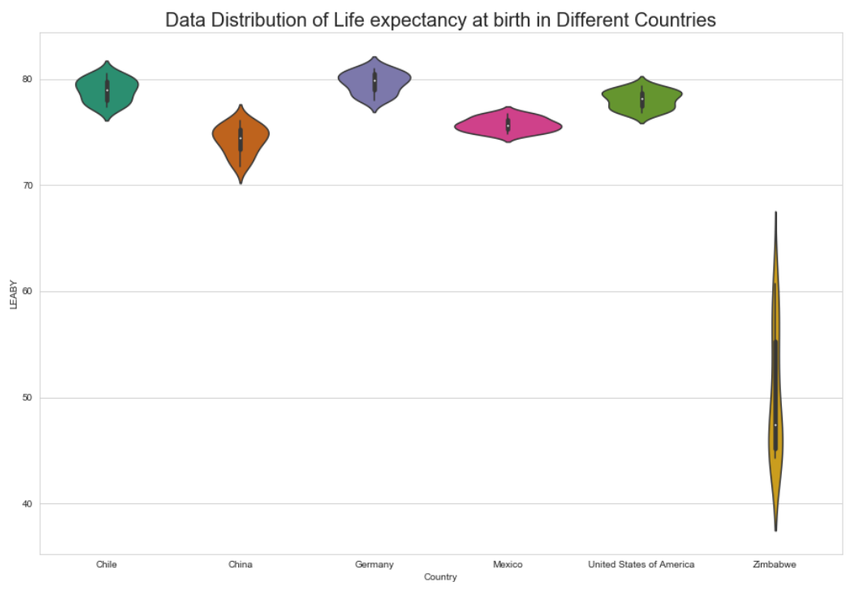




There is a big disparity between two graphs. GDP data shows drastic difference between countries, however, most of them have insignificant difference in LEABY, except for Zimbabwe.

Dive in Data: Life Expectancy at Birth vs GDP

Barplot for LEABY didn't show any patterns in data. To have a better view, we will visualize it via violin plot, to see data distribution.

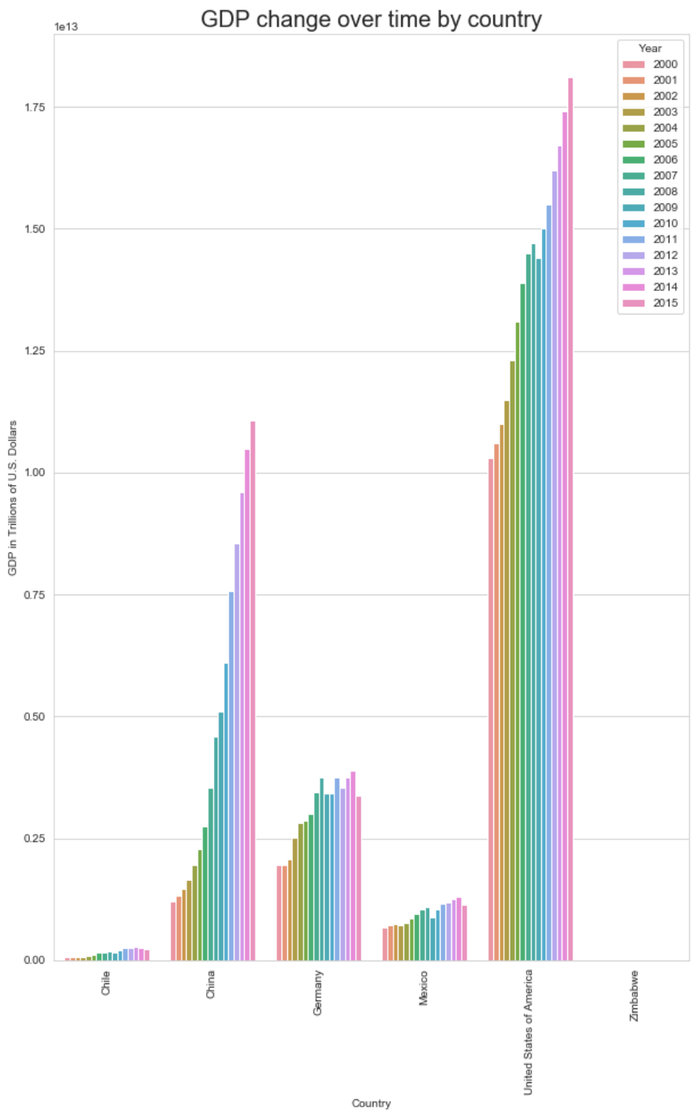


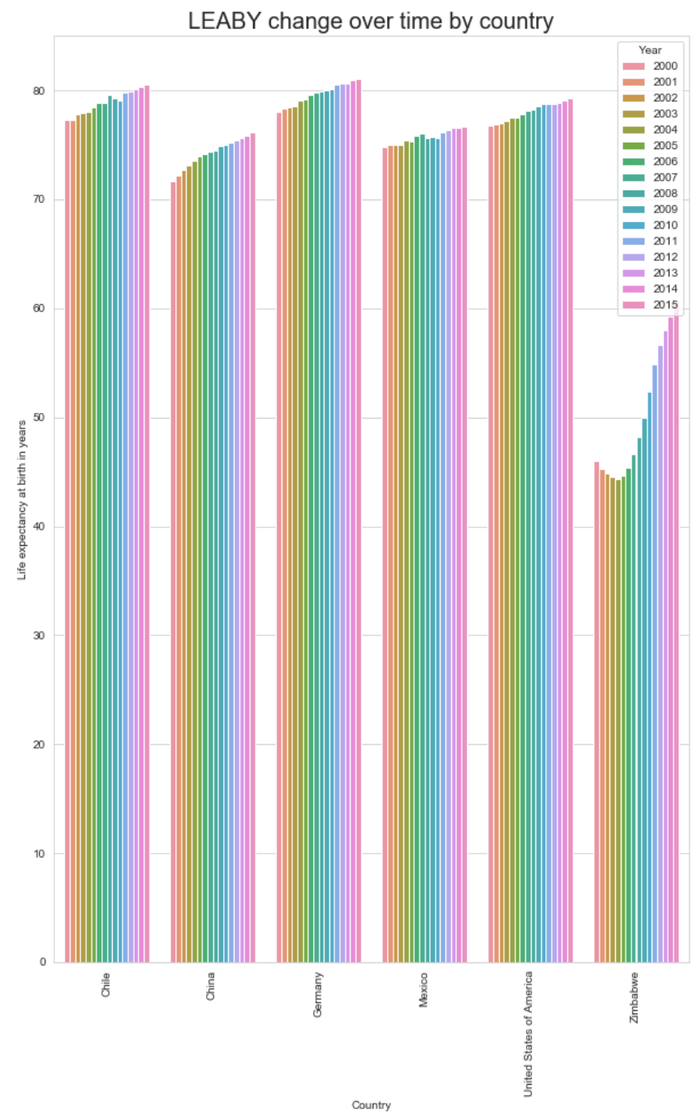
Zimbabwe's life expectancy has changed the most. It has the highest distribution of data.

Now that we dived into our data, we can begin to look for patterns. Firstly, we need to compare two variables visually: LEABY and GDP change over time.

Do you see what I see?

Lets modify our bar plots to see a better picture and juxtapose two plots.





The most drastic change is shown by Zimbabwe in LEABY. However Zimbabwe showed almost no change for its GDP. China and USA, however, showed amazing growth in GDP; USA had high LEABY before this GDP leap, and showed almost no change. China had a significant increase (5 years) in LEABY over the period of 2000-2015. Period of 2005 - 2015 shows the biggest change.

We can immediately see that the least change in GDP is shown by Zimbabwe, Chile and Mexico. Zimbabwian economy was affected by hyper inflation and currency depreciation rate. Due to the fact that GDP is in $USD, it seems like Zimbabwe's growth was almost 0. Which is wrong, because GDP doesn't reflect differences in the cost of living and the inflation rates of the countries. China is a great example to show correlation between LEABY and GDP, because according to Investopedia.com - Chinese Yuan showed a very little change in it's currency value. And according to Trading Economics, inflation rate was less than around 2.5 percent and sometimes inflation was replaced by deflation.

Scatter plot will make it easier to see the possible correlation between GDP and life expectancy. We will plot each set of data on its own subplot, on a shared figure.

Zimbabwe is on the LEABY rise!

This scatter graph is greate to show change in data by year, however hard to perceive, because we have to look at graph legend to identify the color. Lets try to visualize the same data, but using line graph.

For the most countries, LEABY was at high level and had insignificant increase over period of 2000-2015. Zimbabwe's LEABY was very low (and still is). The higher LEABY, the harder it is to increase it. Perhaps it's because there are other factors must be taken into consideration for such increase. At some point it only requires to open additional hospitals, increase access to water and food and it will boost LEABY. But for such countries as Germany and USA, to increase it even by few points will require additional extras.

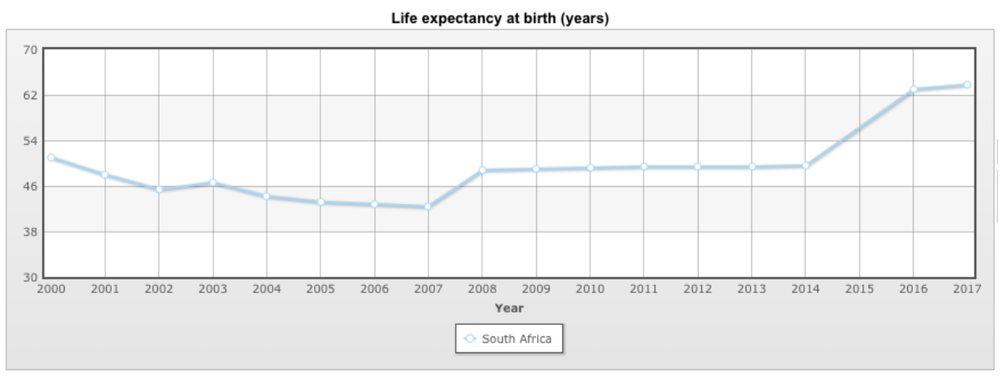
Last look at GDP to draw a conclusion

It is clear, that other countries, such as Chile has low GDP, but high LEABY. This means, that GDP is only one of many variables that affect LEABY. Lets cement this conclusion by comparement of Zimbabwe and another interesting country.

Zimbabwe vs South Africa

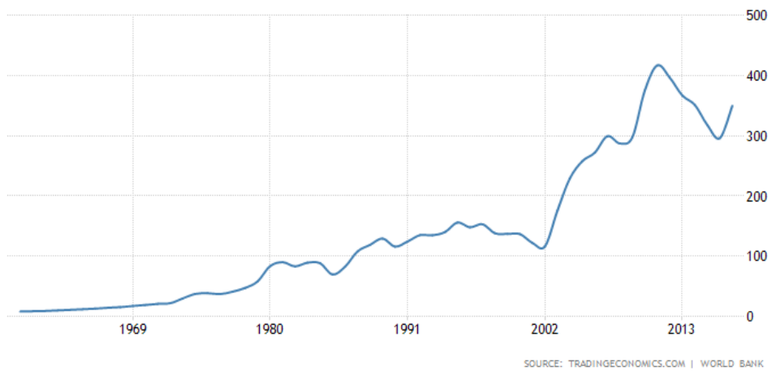
Whereas Zimbabwe has no change in GDP, but increase in LEABY, South Africa on the other hand has dramatic increase in GDP and almost negative trend in LEABY. Take a look at graphs, which were kindly provided by Index Mundi website.

LEABY in South Africa for the period 2000 - 2017



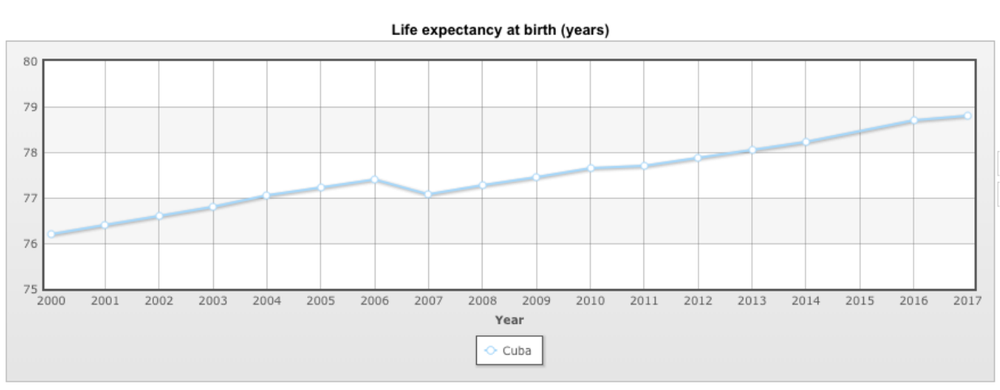
Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2016	2017
South Africa	51.1	48.09	45.43	46.56	44.19	43.27	42.73	42.45	48.89	48.98	49.2	49.33	49.41	49.48	49.56	63.1	63.8

GDP growth in South Africa for the period 2000 - 2015



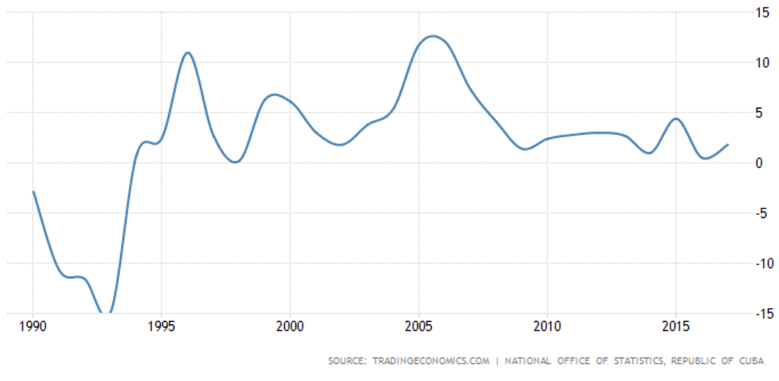
Interesting! There is not visual pattern between two graphs. In fact, LEABY is affected by many parameters, such as climate, access to public medical services, labor regulations, gender and etc. GDP is not a major variable. Take a look at Cuba.

LEABY in Cuba for the period 2000 - 2017



Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2016	2017
Cuba	76.21	76.41	76.6	76.8	77.04	77.23	77.41	77.08	77.27	77.45	77.64	77.7	77.87	78.05	78.22	78.7	78.8

GDP growth in Cuba for the period 2000 - 2015



Cuba is a socialist country with a high level of public medical services and accessible education. It has a very comfortable climate and access to basic needs, despite the fact, that its economic power is insignificant.

Conclusion

The initial set of data was insufficient, so we analyzed extra data for other set of countries. Graphs showed no significant pattern between two sets of data - GDP and LEABY. In fact, building conclusion on data that was analyzed, we can conclude, that GDP is only one of many variables that may affect LEABY.

Tagged in : LEABY GDP Zimbabwe TheBestResearch

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