Is Longer Life Contributing to China's Economic Growth?

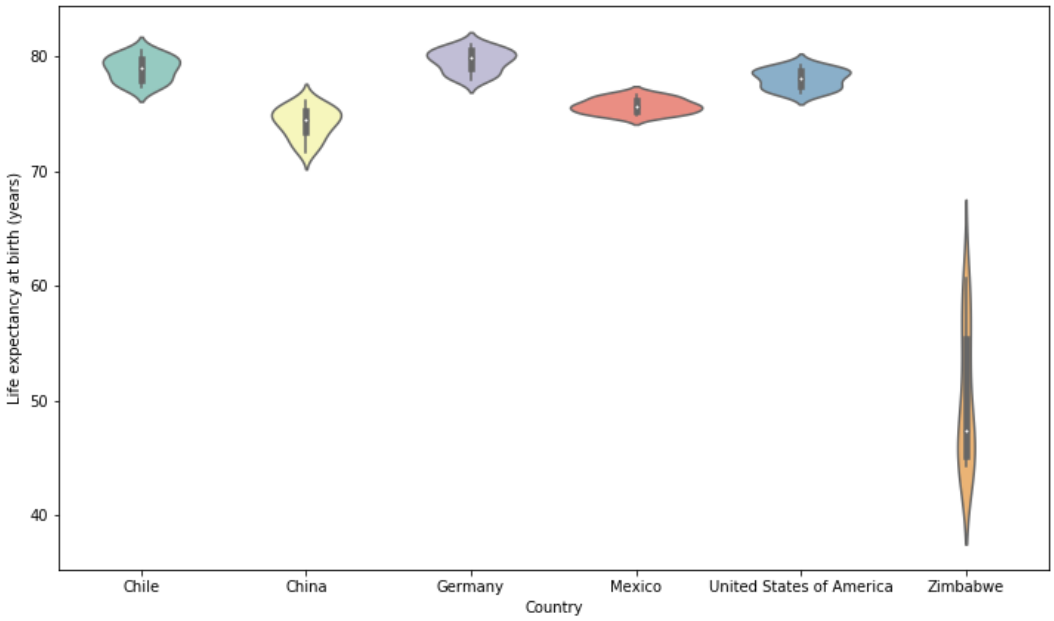
I'm not actually a blogger, but today I'm pretending to be one. You see, this post was written as part of a final research project for the codecademy data visualization with Python course. As an engineer trying to write something mildly captivating, please bear with me. As an engineer trying to clearly present GDP and life expectancy at birth data collected between 2000–2015 by the World Health Organization, I hope you learn something valuable.

Before we get into the hard data I think it's important to explore a bit of background on the subject, starting with the Gross Domestic Product. Gross Domestic Product, or GDP, is a measurement used to quantify a nation's economic activity over a certain time period—usually annually but quarterly is not uncommon. The GDP calculation includes "all private and public consumption, government outlays, investments, private inventories, paid-in construction costs and foreign balance of trade" (source). It answers the question: what is the size of the country's economy?

Life expectancy at birth, as its name implies, is defined by how long a newborn can expect to live if death rates remain unchanged (source). It not only indicates health of a country's population, but can also give insights to a country's economic health. Long lifespans tend to imply a higher quality of life, which in turn would lead to more able bodied people in the workforce for a longer amount of time. While this isn't always the case, it can be a contributing factor to a country's rise in economic power.

While I will focus mainly on the relationship between these two variables and what they can tell us about China's rapid growth over the past 15 years, I will also use data from 5 other countries provided in the database to help draw conclusions and provide a point of comparison. The countries included in this analysis are: Mexico, Germany, Chile, Zimbabwe, the United States, and China.

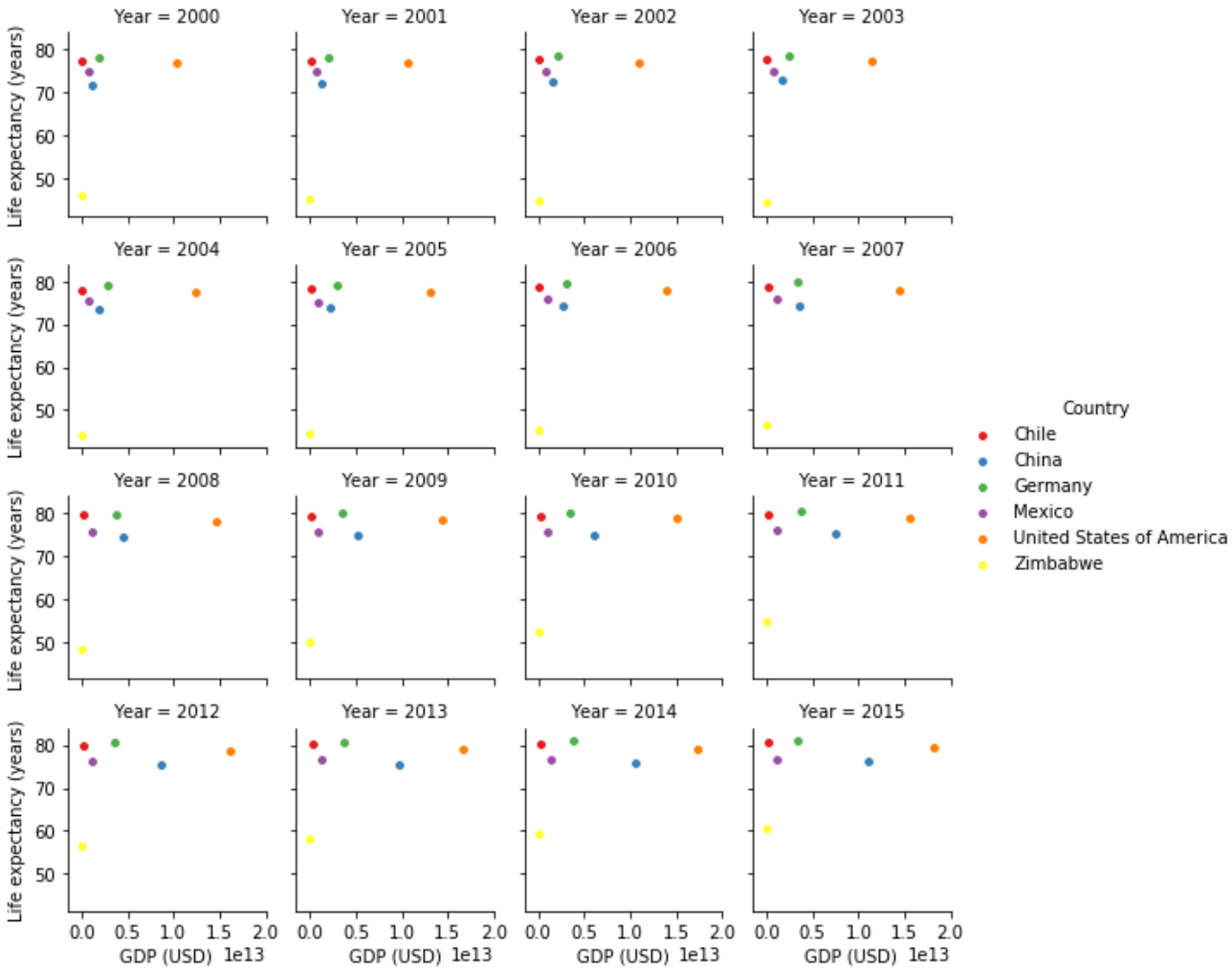
Let's start by taking a look at the violin plot below, which depicts the life expectancy distribution by country. The colored aspect of the violin plot consists of two kernel density (KDE) plots that are symmetrical along the center line. The white dot represents the median, and the thick black line represents the interquartile range. For more information on reading a violin plot, please click here.



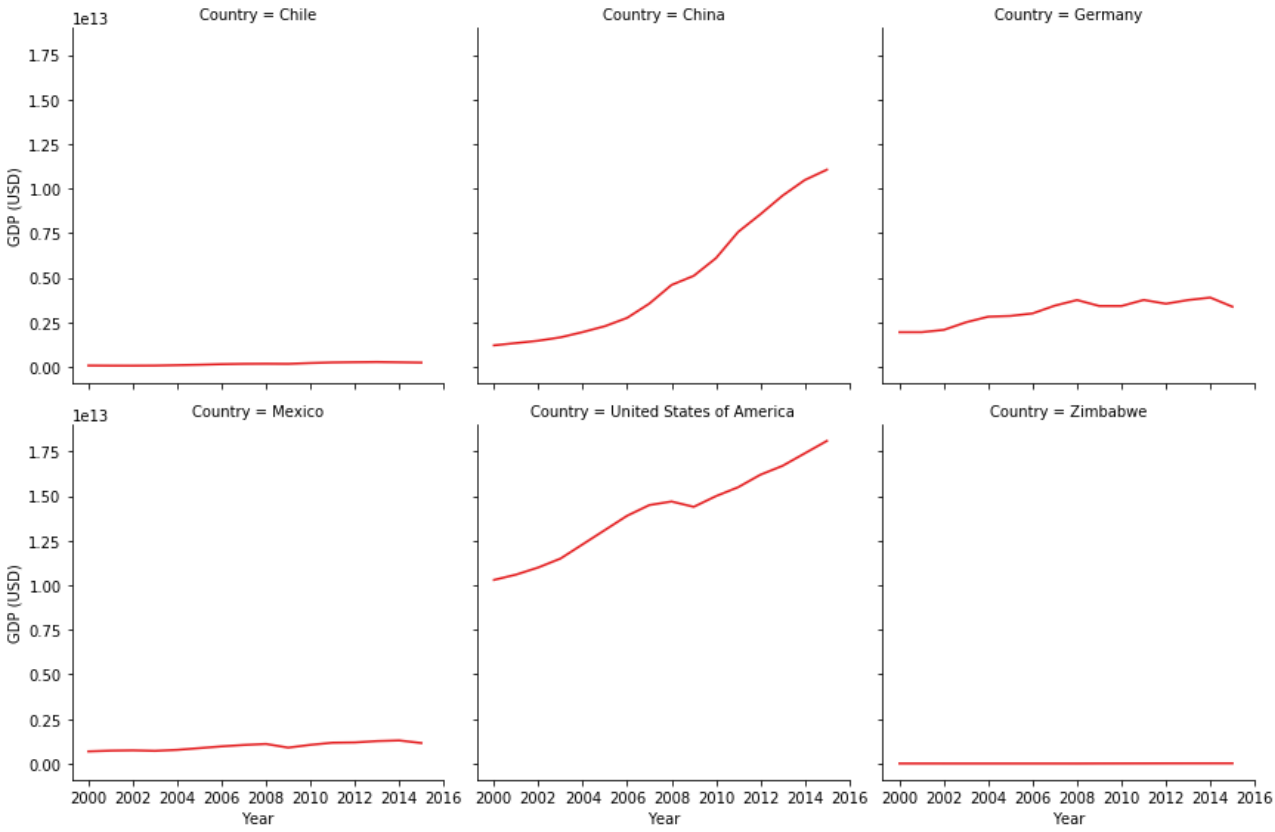
As you can see, China's life expectancy at birth is skewed left, whereas Mexico is evenly distributed. Chile, Germany and the United States are bimodal with data skewed left. Zimbabwe is also bimodal, however its data is skewed right. In general, it can be said that the majority of the population of Chile, China, Germany, Mexico, and the United States will live to be 72–80 years old. The majority of Zimbabwe's population will live to be 50 years old.

With these distributions in mind, let's compare the life expectancy of these countries with their respective GDP between the years 2000–2015.

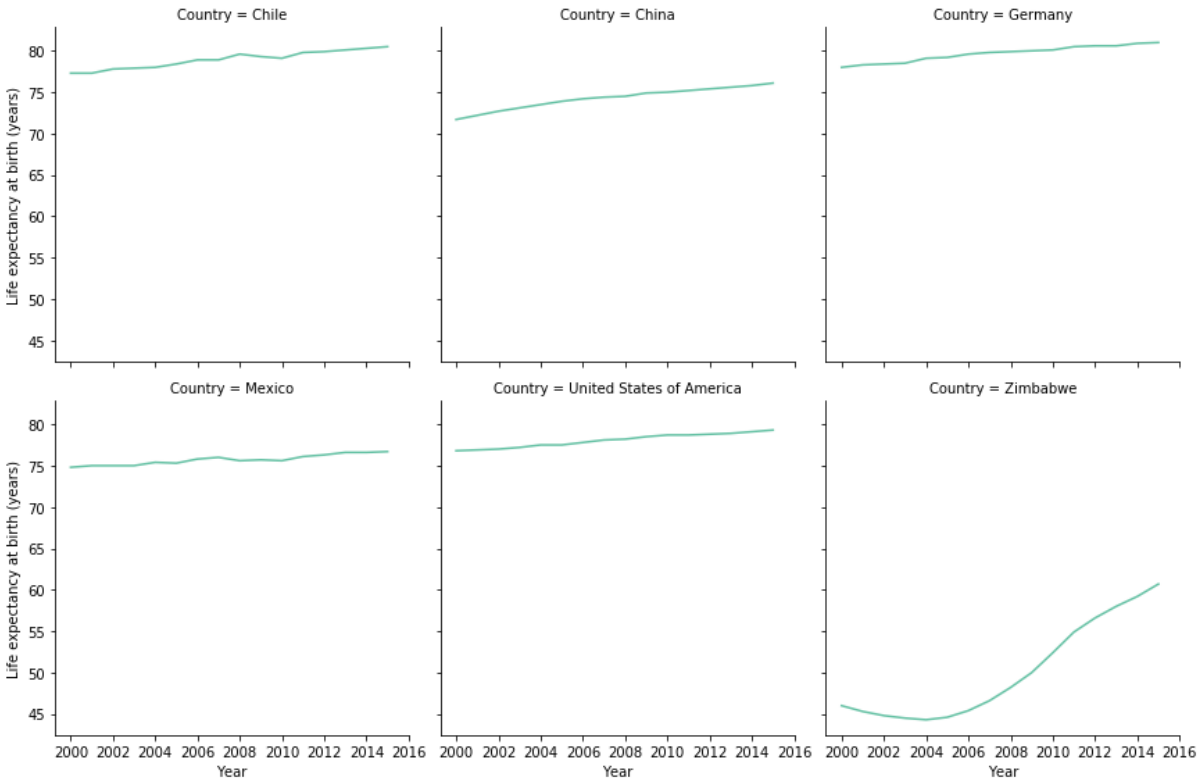
As the country's marker increases in the y-direction over the series of graphs, it indicates that the population's life expectancy at birth also increases. That is, people are living longer. As the country's marker increases in the x-direction over the series of graphs it indicates that the GDP is increasing, which translates to economic growth.



Breaking this down into its components, we can clearly see changes in GDP between the years 2000–2015, based on country:



And the changes in life expectancy between 2000–2015, per country:



In general, the GDP across all countries increases with time, but at varying levels and rates. The life expectancy across all countries also increases with time at similar levels and rates, with the exception of Zimbabwe.

So, does a longer life expectancy directly impact GDP? Chile has one of the lowest GDP's and highest life expectancies. Germany and Mexico also have high life expectancies, but their GDPs are not much higher than Chile's. The United States and China both have high life expectancies and experience rapid GDP growth during the 15 year time period. Finally, Zimbabwe's GDP remains stable, while the life expectancy decreases until 2004, where it reaches an inflection point and grows for the remaining 11 years.

It does not appear that the growth rate (slope) of the GDP and life expectancy correlate either, showing that a faster growing GDP does not equate to a longer lifespan, and vice versa.

Based on these observations, we can infer that no, a long life expectancy does not directly influence the economic health of a country. However, I still think there's something to be said about life expectancy and economic growth.

What this data set didn't take into account was population growth. Which, in my opinion, is an exclusion of an important piece of information. When the worlds largest population begins to live longer and the government creates legislation that fundamentally changes the way business, trade, and manufacturing is done in China, the effects are resoundingly evident. Non-numeric variables, such as historical and cultural values, also play an important role in the development of a country's economy.

Whether any of this news is “good” or “bad”, I’ll let you decide for yourself. However, if you’d like to read up on China’s growth from other “real bloggers”, I’ll leave some links below.

- China’s Economic Growth, Its Causes, Pros, Cons, and Future (the Balance)
- China’s Economic Growth Looks Strong. Maybe Too Strong. (NY Times)
- Economy of China (this is a Wikipedia article, but it’s a great jumping off point for further research)
- Why is China’s GDP growth so rapid? (a Quora answer, but interesting food for thought)
- The World’s Top 20 Economies (Investopedia)