

Final Project

What's the picture of openness to trade -- an exploration of the correlation between openness to trade and GDP at Purchasing Power Parity



Introduction

We are born and grown up in the concept that world trade is beneficial for our own country as well as for others. But now the voice of regional protectionism gets louder, thus starting a debate of whether we should continue to keep our international trade policy friendly. In this context, I would like to look into the exports and imports numbers from 1990 to 2017, as well as the purchasing power index, to investigate the relationship between foreign trade openness and purchasing power. To properly visualize the topic, I gathered data from The world bank data: 1) Exports of goods and services (% of GDP), 2) Exports of goods and services (% of GDP), 3) GDP per capita, PPP (current international \$).

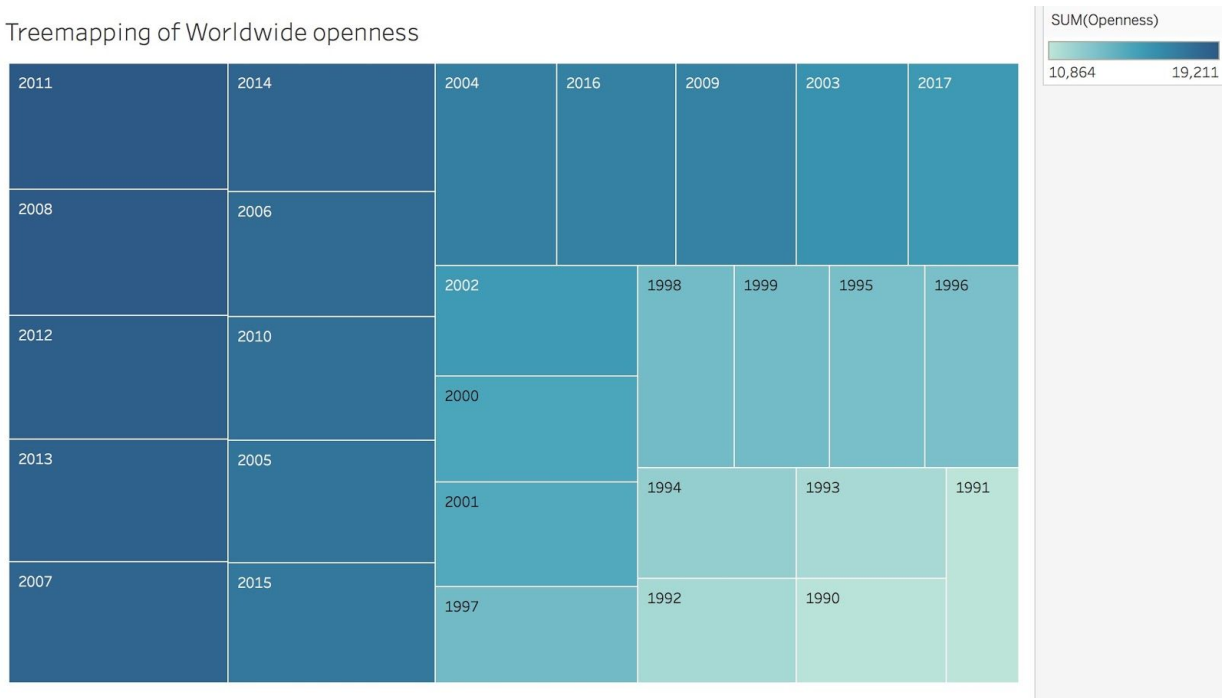
Term explanations:

Trade openness: the sum of imports and exports normalized by GDP.

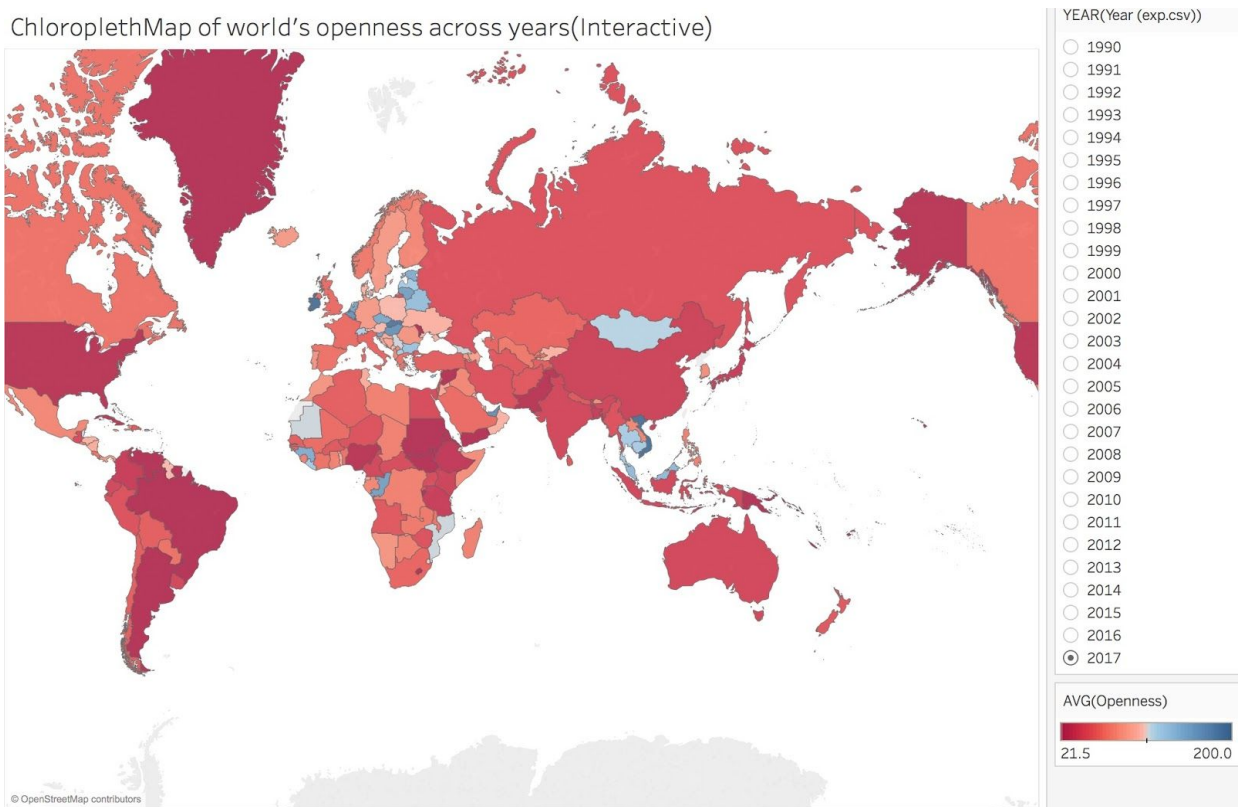
GDP at Purchasing Power Parity: Purchasing Power Parity (PPP) is measured by finding the values (in USD) of a basket of consumer goods that are present in each country.

Summary of Data

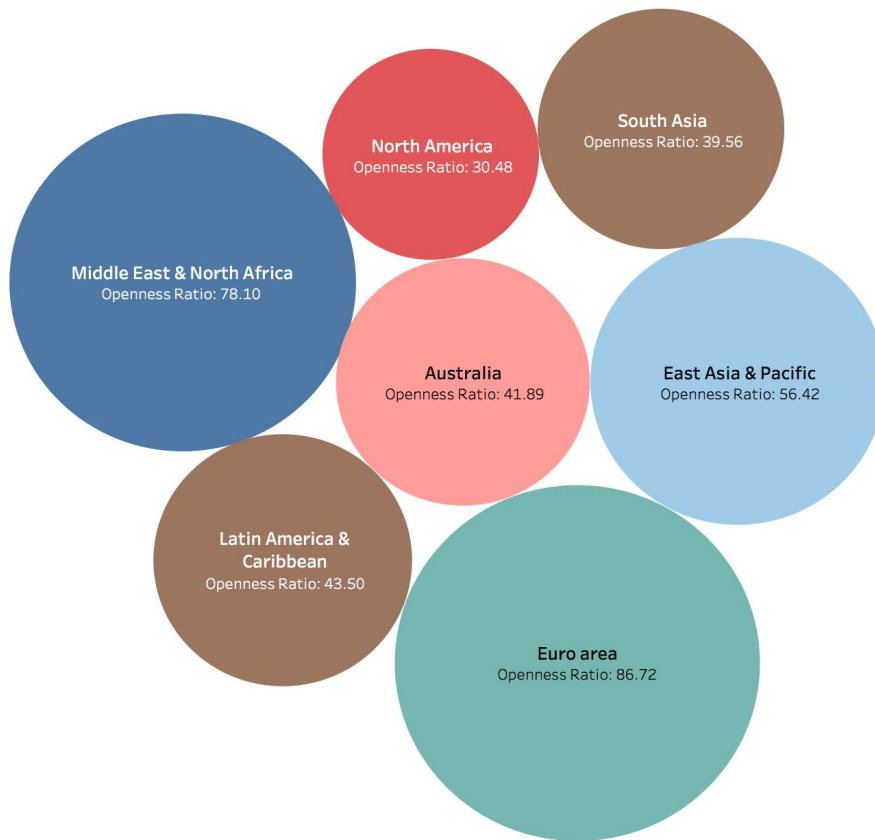
Treemapping of Worldwide openness



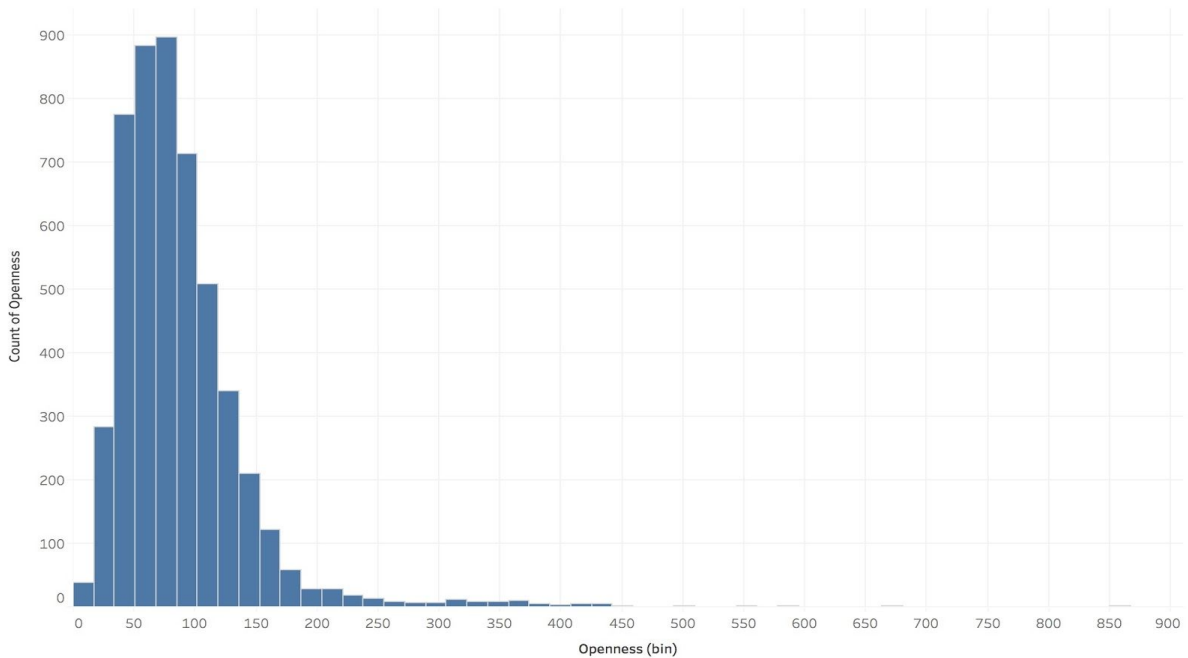
ChloroplethMap of world's openness across years(Interactive)



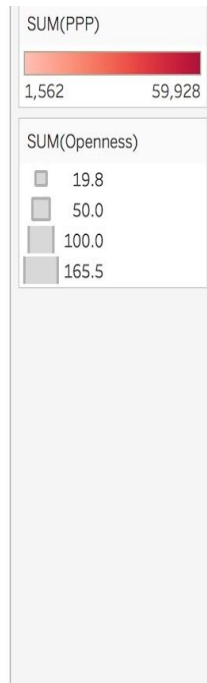
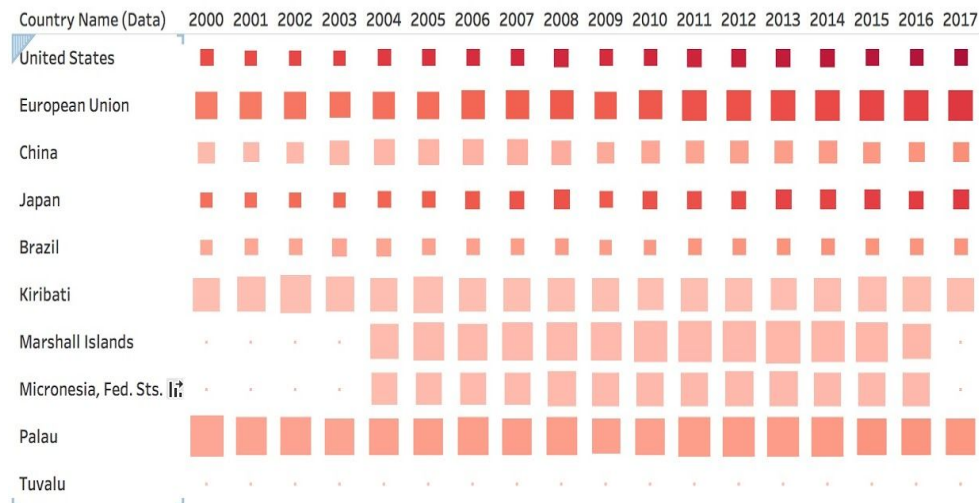
BubblePlot of continents openness ratio in year 2017



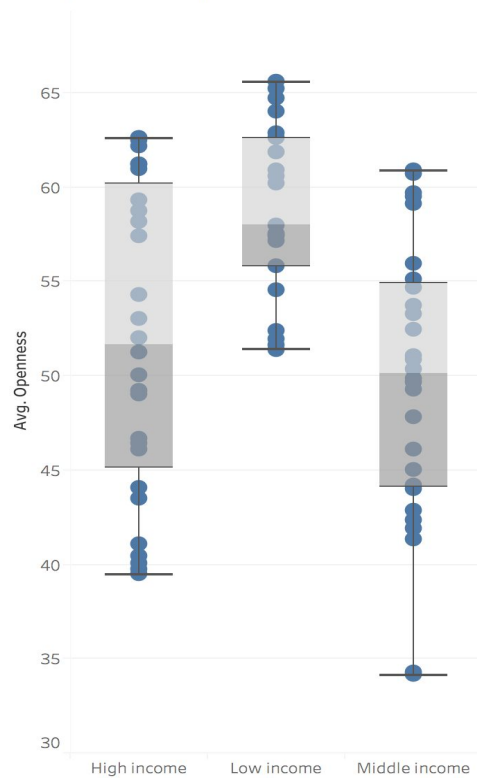
Histogram of world's openness ratio



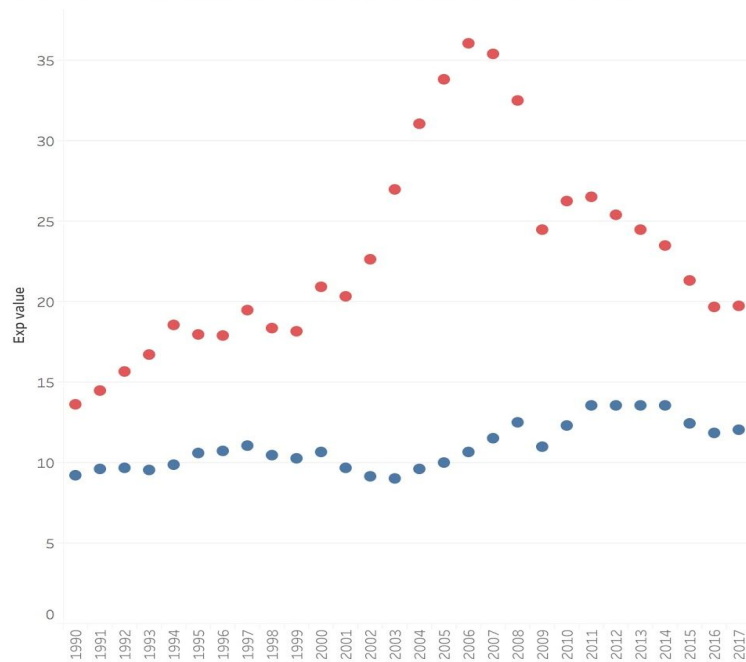
Heatmap of top 5 and bottom 5 countries' openness&PPP



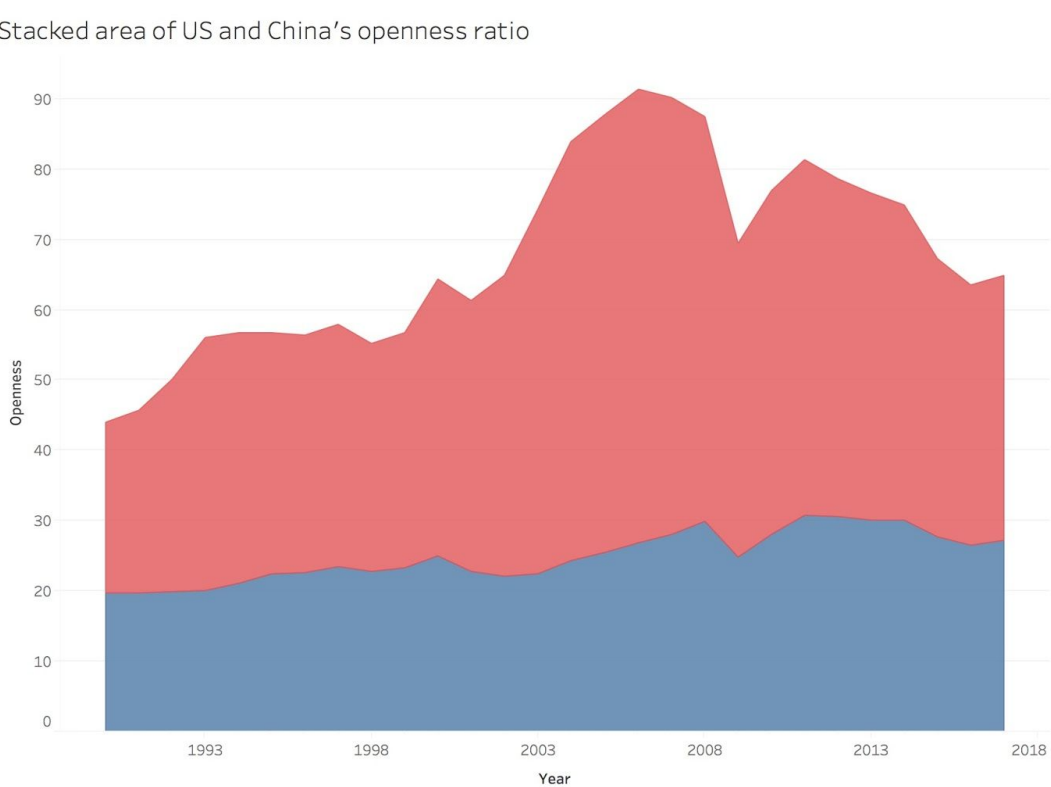
Boxplot of different income categories of openness ratio



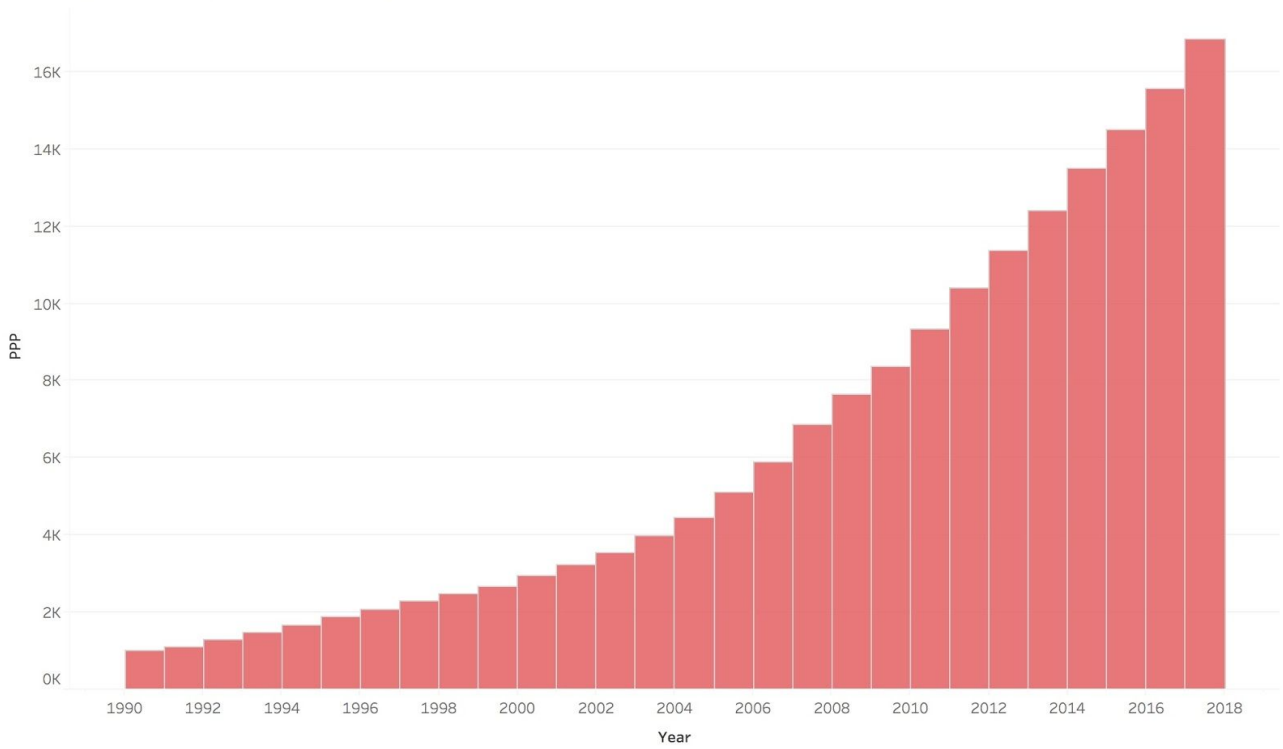
Scatterplot of China and US's export value over the years



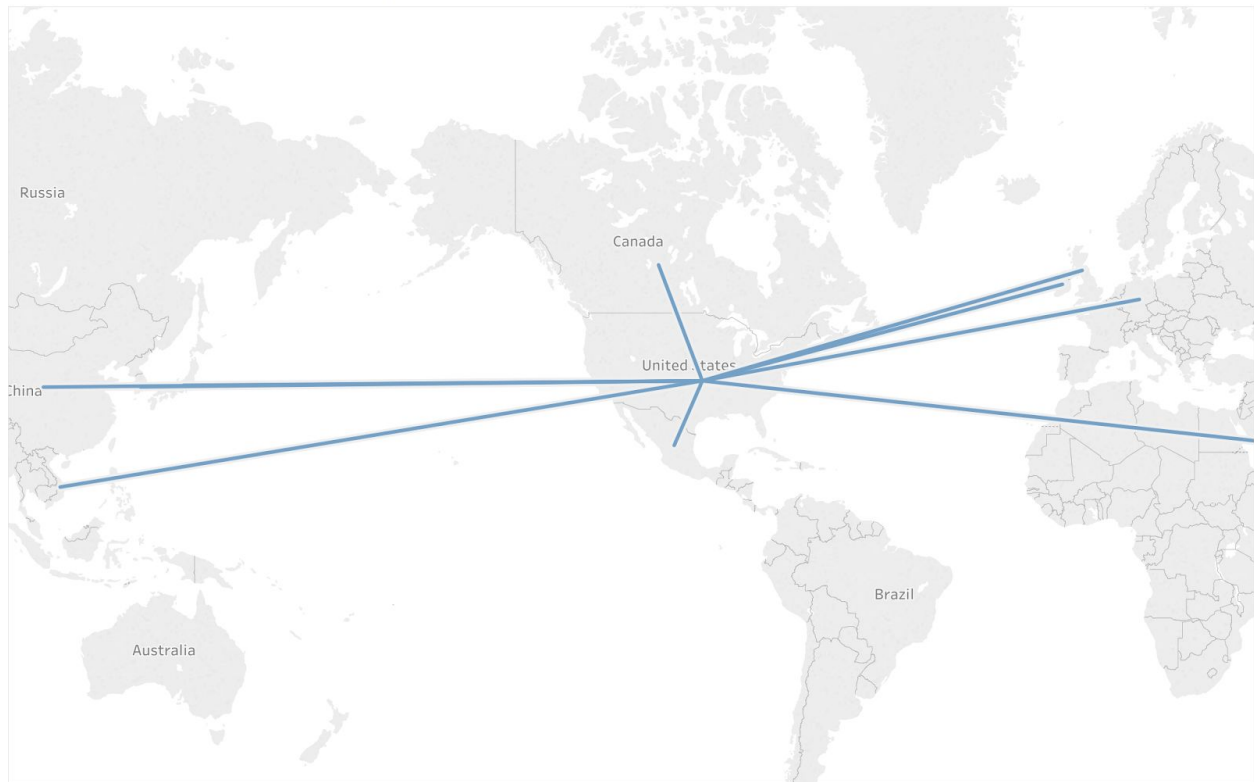
Stacked area of US and China's openness ratio



China's purchase power over the years



US's top trading partner(import,year to date)



Storyline:

Overall, after the year 2000, worldwide openness is increasing. However, after the year 2015, worldwide openness decreased a lot. The year 2016 and year 2017 are showing that the countries are trading less internationally. Even falls back the numbers of 2003. Looking closely, from the country's side, some small countries (Vietnam, Slovak) have bigger openness ratio than big countries, like China and the US. From the continent's side, Middle east&north Africa and Euro area are more open than South Asia and North America. From the histogram, we can conclude that most countries' openness ratio is around 60%-100%.

How about the relationship between income/purchase power and trade openness? By filtering out the top and bottom 5 countries data, bottom 5 countries generally have higher openness but lower PPP. Among the top 5 countries, the European Union is most open to trade. And from the boxplot, low-income countries out-perform than high-income countries, middle-income countries have a larger range of openness ratio.

Now, let's focus on China and the US, the world's top 2 countries, as well as the spotlight of trade war happening now. China has an advantage of exp/GDP ratio, and through the year 2000 and 2009, the ratio increased sharply, in line with the fact that China joining WTO. While the US has a steady lightly increasing pattern of export value. As for the openness ratio, China has trade openness ratio from 40% in 1990, to 90% in 2016, while the US keeps a steady ratio of around 20%. As for the import part of the US, from the map, we can see the major trade partners are China, Canda, India, the UK, Germany, and Mexico.

Conclusion:

The data actually tells us another story of purchasing power and trade openness. Traditionally, we would think that high_income/PPP countries will have larger openness than low_income/PPP countries. But the fact shows the opposite.

But in general, the world has experienced almost 20 years of trade openness, the world has benefited from international trade since PPP is increasing. Small economics has higher openness ratio may due to the fact that they have smaller GDP, so the relative ratio is higher than the countries whose GDP are much more larger. Also, from China's point of

view, China has experienced the best time of world trade and remains high openness ratio almost 3 times of the US.

What will happen in this round of trade negotiation? Will the world turned away from international trade? What's the impact on people's well-being? Economics metrics such as GDP, PPP are lag indicators, and immediate effect may not showed instantly. We need to hold our breath and see.

Link to GitHub page:

https://github.com/ztzeng/Data_Visualization

Citations:

<https://www.enotes.com/homework-help/what-trade-openness-87695>

<https://www.sciencedirect.com/topics/economics-econometrics-and-finance/trade-openness>

https://simple.wikipedia.org/wiki/Purchasing_Power_Parity

<https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html>

