

Capstone Analytic Report and Research Proposal
Unit 4 / Lesson 2 / Project 2
Analytic Report and Research Proposal by John Foxworthy

The dataset that I will be using are the Daily U.S. Treasury Yield Curve Rates and its significance is the global importance in the financial trading industry, data quality and its statistical significance. The figures below have daily dates as rows with maturity points as columns. For example, a ten year is 2.97 percent as of the 1st of May, 2018, which is the amount of the interest rate on a decade long loan. The data goes back to 1990 up until to the current date in 2018.

Date	1 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
05/01/18	1.68	1.85	2.05	2.26	2.50	2.66	2.82	2.93	2.97	3.03	3.13
05/02/18	1.69	1.84	2.03	2.24	2.49	2.64	2.80	2.92	2.97	3.04	3.14
05/03/18	1.68	1.84	2.02	2.24	2.49	2.62	2.78	2.90	2.94	3.02	3.12

[Daily Treasury Yield Curve Rates](#)

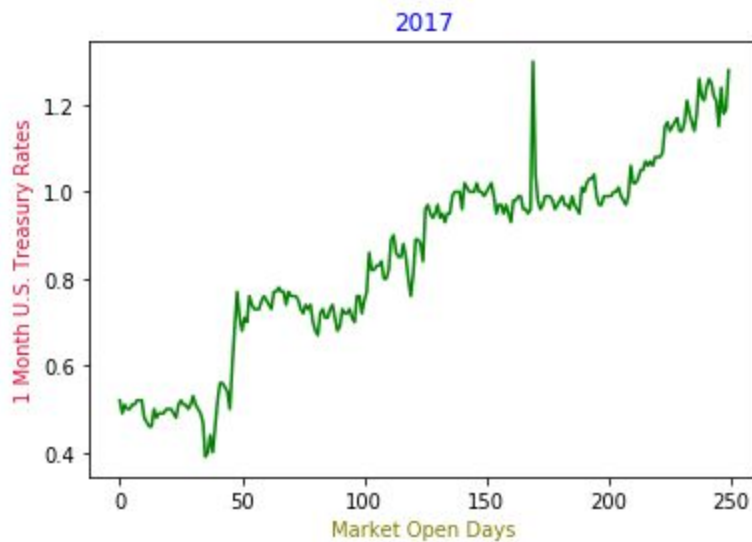
Each of the figures represents hundreds of billions of U.S. dollar trades from participants from dozens of countries and have the impressive data attribute of a complete absence of stale data. Not some, but all figures, on each business day of the year, has at least one person and likely many people trying to influence the interest rate values to change. Specifically, the strong liquidity, in other words, the quantity of buyers finding sellers and vice versa is very high, in every trading day, in the year going back decades since the U.S. Dollar is the world's reserve currency. According to organizations like the International Monetary Fund (IMF), 6 out of 10 or 7 out of 10

transactions by physical hand or electronically, involve the U.S. Dollar. There are more than 200 countries in the world and each have some type of exporting and importing business that does involve the U.S. Dollar. The more a country exports, the more their currency, not the U.S. Dollar, rises in value because of increased demand, thereby making the value of their exports more expensive. To counteract, countries buy U.S. Dollars to dampen their local currency appreciation and the most common format is in the U.S. loan or fixed income market. Borrow a month at 1.68% or a year at 2.26% in U.S. dollars on the 1st of May for your exporting business from the Daily Treasury Yield Curve, for instance. Not to mention, the U.S. economy is the largest country in the world so there are plenty of individuals and institutions that depend on this data to raise money for countless causes from a mortgage loan for a residential property to purchasing a new office building for an expanding company or local government institution.

Lastly, the source of this data is the U.S. Treasury department of the U.S. government. There are no impediments for the use of this data as it public from a legal perspective and officially published by the U.S. government on every business day. Daily Treasury Yield Curve is widely used by countless people and institutions for many causes and I choose it to forward my career in Data Science.

Plotting lines, histograms and other data visualizations from csv, xml or json files will not have an issues of daily rates data, but more importantly, the evolution throughout time over the past decades, would help in advanced statistical techniques in the coming months of the Thinkful Data Science course. Below is a small piece of code, and its line plot of the 1 month maturity point column for all of the 2017 year from a json file. There are roughly 250 business days in a given year so beyond the demonstration below there are about 6,750 business days for this single column only from 1990 to 2017. Furthermore, the 11 columns from the 1 month to the 30 year would be more than 75,000 interest rate daily data from 1990 to the current day.

```
# In[1]: import json, matplotlib.pyplot as plt, pandas as pd
# In[2]: json.load((open('/Users/lacivert/Documents/lmo.json')))
# In[3]: sample_json_df = pd.read_json('/Users/lacivert/Documents/lmo.json')
# In[4]: sample_json_df
# In[5]: plt.plot(sample_json_df,color='green'),
plt.ylabel('1 Month U.S. Treasury Rates',color='crimson'),
plt.xlabel('Market Open Days',color='olive'),
plt.title('2017', color='blue')
```



Looking forward, it would be interesting to see the underlying drivers of this data, what are the associations from one maturity point column to another and how the shape of the daily yield curve has evolved throughout time. Maybe it is too early, but principal component analysis could be a viable candidate for my project as a statistical technique, but this is not my final answer for now in May of 2018. In conclusion, I look forward to demonstrate my net worth in the coming months . . .

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