Project 4 Design Document

How Do Markets React to Republicans and Democrats?

Panko Aliaksandr

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Contents

1 Project Description

In this project I would like to find out how market's performance of the USA is connected with a governing party. The process contains next steps:

1. Retrieve Presidency data from the web site
2. Prepare the data for analysis
3. Download historical stock markets data
4. Calculate annual returns

5. Segregate returns in terms of Presidency
6. Calculate measures of central tendency for the returns
7. Compare results using visualization

2 Retrieve data for a list of USA presidents

The Wiki page gives a list of all US presidents and the parties they belonged to. This page was used to retrieve the data.

I decided to use Python to create .csv file with appropriate information. The whole process was divided into next steps:

1. Create initial data table To do this a special python function is used:

$$pd.read\_html(link) \tag{1}$$

2. Clear and Prepare data After initial download the data has bad structure and contain empty elements. To prepare well-structured data set next operations were used
   - Column names were set
   - Useless columns were deleted
   - Years, Presidents and Party names were retrieved using special patterns Python regular expressions library was used, namely:

$$re.findall() \tag{2}$$

   - According to the task, data before 1920 year was cut
   - Finally, .csv file was created using pandas function:

$$data\_frame.to\_csv() \tag{3}$$

3 Download Indices Data

This part of assignment is devoted to stock market historical performance. To analyze it two USA stock market indices were used: DJI and S&P500. Information from 1920 up to now was required, however the first challenge was to find it. The solution was found using "Quandl". I faced two problems here:

1. Quandl does not store daily data for S&P500 Actually, it is not critical, since we need to use annual data

2. Quandl has DJI data only till 2016-04-15 The issue was solved using Yahoo Finance, which has required information

So, the whole process contained next steps:

1. Download monthly data for S&P500 from Quandl (till 2017-10-01) To do this quandl library method can be used:

$$quandl.get() \tag{4}$$

2. Download daily data for DJI from Quandl (till 2016-04-15)

3. Download daily data for DJI from Yahoo Finance(since 2016-04-16 till 2017-10-01) To do this *pandas_datareader* method can be used:

$$pdr.get\_data\_yahoo() \tag{5}$$

4. Combine data for DJI into one data set using pandas method:

$$pd.concat() \tag{6}$$

4 Calculate Annual Returns

Having daily data for DJI and monthly for SP500 I needed to calculate annual returns. For this purpose I wrote a special function, which calculate periodic returns, namely: "Total_Return_From_Returns"

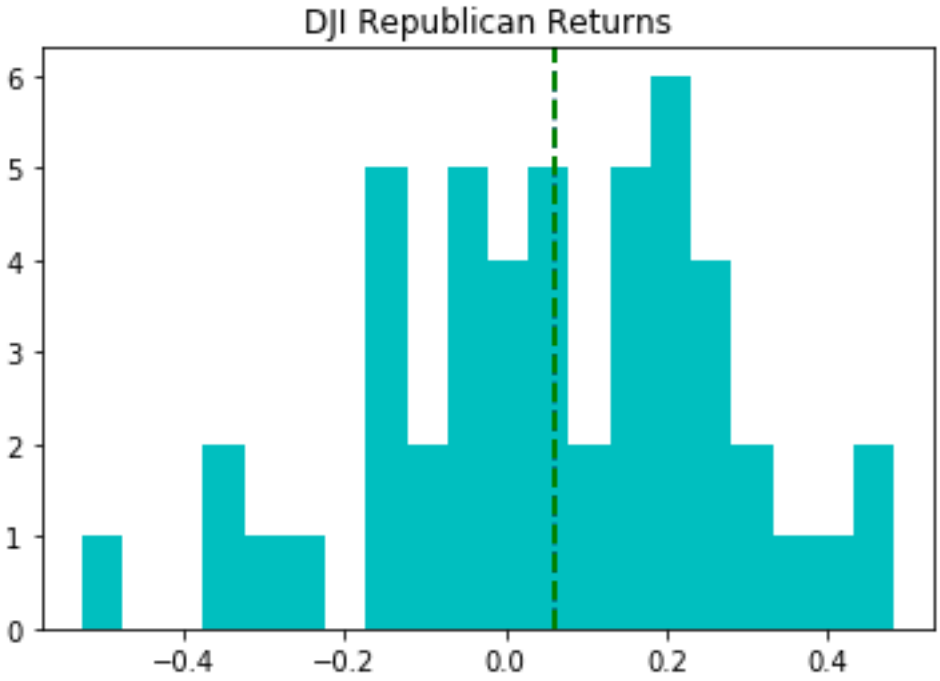
5 Segregate Returns

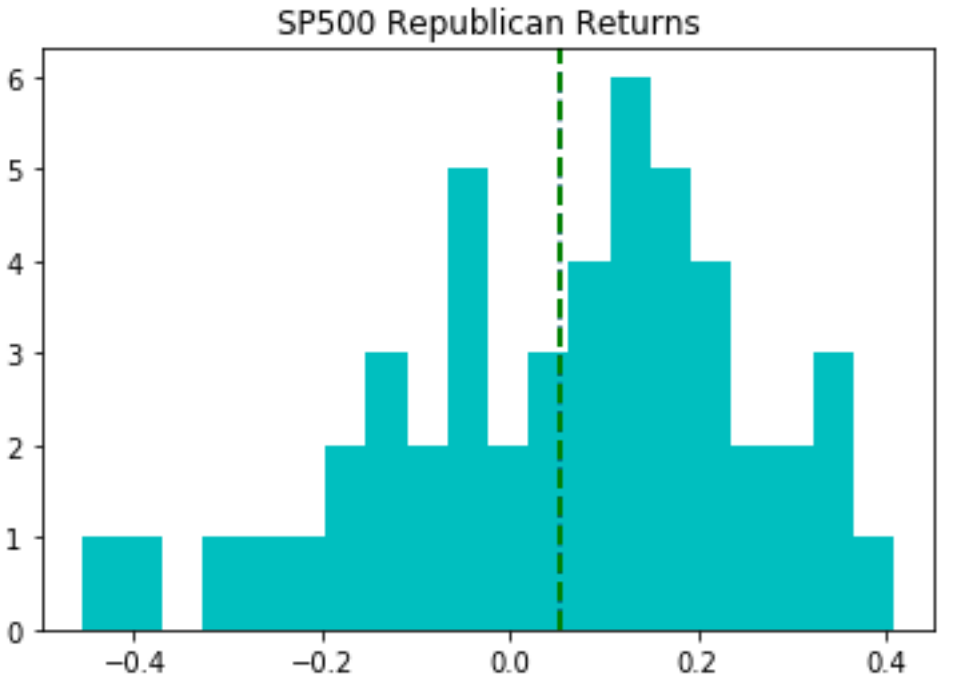
The next step of the assignment is returns segregation in term of ruling parties. To do that, for each of the president I determined his start year and finish year. Having this information, I determined corresponding returns and then based on "Party" property separate information.

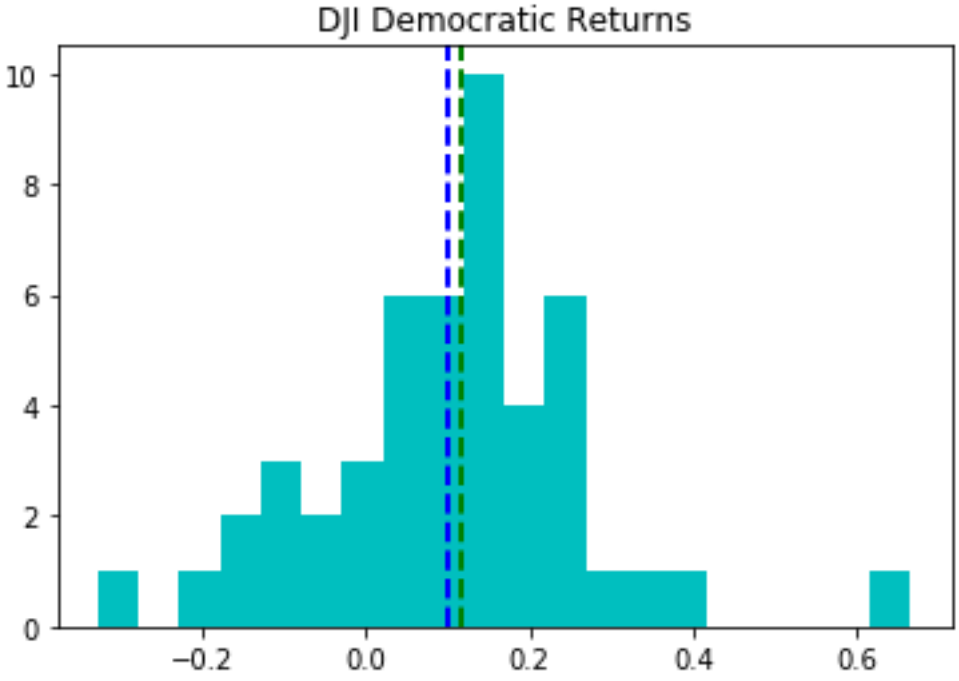
6 Results Visualization

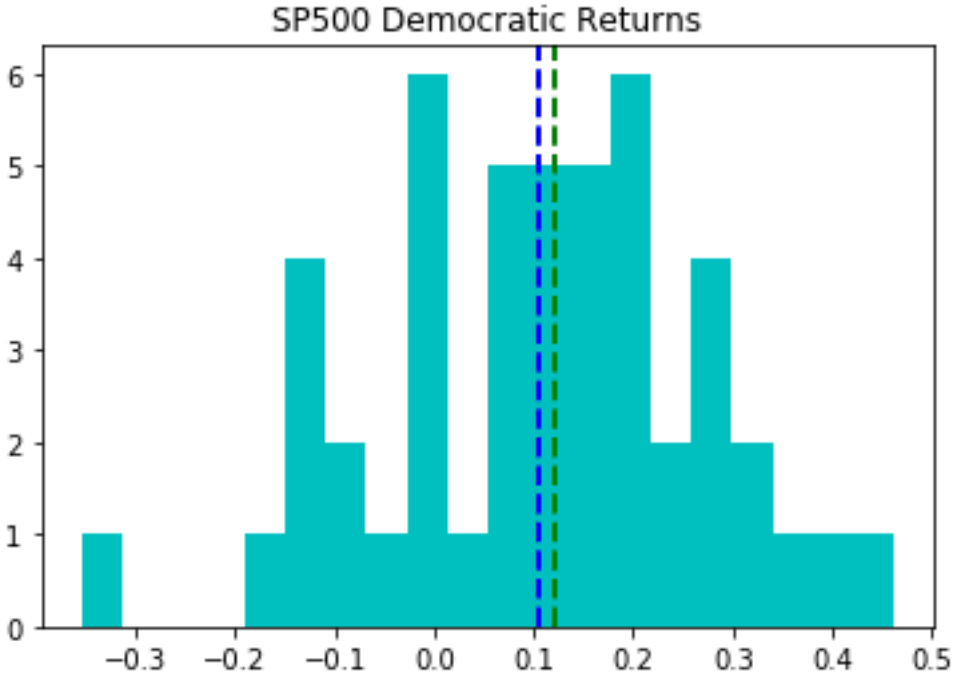
The last section contains 2 parts:

1. Statistics Calculations (Mean, Median and St. Deviation)
2. Visualization Process




SP500 Republican Returns
6
5
4
3
2
1
0
−0.4
−0.2
0.0
0.2
0.4


DJI Democratic Returns
10
8
6
4
2
0
−0.2
0.0
0.2
0.4
0.6



7 Conclusion

As we can see, during Democratic period market performs better, but we should take into consideration that the worst periods (depression and 2008 crisis) was during Republican terms.