Intermediate Report (Ryan Rigby, Scott Gale)

Project Introduction

The overall goal of our project is to study whether trends in stock market prices can be correlated to the outcome of presidential elections. Generally speaking, high correlation is not exhibited in previous analyses of market data. However, we suspect that trends may exist when analyzing sectors individually, rather than the entire market.

Project Progress - Data Collection & Preparation

A lot of effort went into our data collection phase. We thought this would be trivial because we would be using well-defined, structured data sets. In practice, finding ticker symbols for stocks that haven't traded on exchanges for a couple decades was difficult. We also encountered issues obtaining data for stocks when multiple stocks have traded under the same ticker. For example, Citigroup currently uses the ticker 'C', but Chrysler also used 'C' before it merged with other auto-makers.

To collect data, we wrote a script that queried the Yahoo Finance API, which provides data for a single stock ticker over a specified range. The data was stored in csv files, combined into a pandas data frame, and then stored in a single csv file to organize the data and facilitate experiments. We have two copies of the data - raw and normalized. For each election cycle, we have normalized each individual stock's price and volume data to the first value in the election cycle. For our purposes, an election cycle is the 30 trading days before the election and the 30 days after an election.

Project Progress - Experiments

We are in the early phases of conducting two sets of experiments, for which we do not have any results. The experiments will use normalized data so that we can compare stocks with vastly different trading values to each other. Experiments and the data produced will be grouped and analyzed in four different election categories based on the political party of the President elect. Democrat to Republican, Republican to Democrat, Democrat to Democrat, and Republican to Republican. We hypothesize that some market sectors, such as Consumer Staples will have little correlation with election outcomes because demand for items such as toilet paper and bread are likely constant, but other sectors, such as Information Technology or Consumer Discretionary are more likely to be correlated with election outcomes.

Experiment 1: Studying differences in stock prices before and after an election with respect to both a stock's market sector and the outcome of the election. We will be using *regression* to measure changes in stock price trends for 30 days before and after each election, and looking to see if the difference in regression parameters between the two time frames correlates with the election outcome.

Experiment 2: Studying volatility in stock prices before and after the election. The volatility calculation itself is a simple standard deviation calculation. Some measures of volatility (namely implied volatility) use an exponential function to assign higher weights to more recent measurements. However, this is not appropriate in this case because the goal of implied volatility is to help predict future price movements, whereas our calculation is intended to show actual historical volatility.

Potential Experiment 3: We don't anticipate getting to this experiment; however, if time permits, we would like to analyze the volume of trading that occurs and see if there is a discernible difference in any of our four categories of election cycles. Changes in stock prices and volatility may or may not be affected by the volume of stock traded. Volume could indicate a shift from one market sector to another that might not otherwise manifest itself in immediate stock prices.

Results/Conclusions

Since we do not have the results of our experiments, we can't comment on what the results will show, but we have drawn sketches of how we anticipate visualizing the data and can have those available at our review. We expect the results to be very subtle since any major findings would most likely be common knowledge amongst investors. As we analyze the results from our regression testing we will be looking for small trends in positive or negative slopes that could indicate correlation with election results. The same holds true with our volatility analysis; small differences before or after the election may indicate differences with market confidence in a particular sector or on the market at large.