

A Linear Regression Analysis On Financial Assets

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Abstract

The goal of this project was to utilize Linear Regression in a viable stock trading strategy. In this scenario, I work for a quantitative hedge fund and they want me to figure out a methodology of using linear regression in trading and if that is a profitable choice.

Design

This project originates from a hedge fund. I am working with time based data in this case and we want to try to accurately predict the price action of a specific asset. There are a few features that will help me analyze how weighted each feature is and what I can do about it. The features are as follows: **DATE, HIGH, LOW, OPEN, CLOSE, VOLUME, and ADJ CLOSE.**

Data

The data contains 21 years of financial data starting from 2000. This was obtained by using **BeautifulSoup** to web scrape the most current **S&P500**. However I used **Pandas** to access **Yahoo Finance** information for all the companies and exported to a file called **stock_dfs**. We were able to obtain the stock data for the date, high, low, open, close, volume, and adj close.

Algorithms

First I wanted to analyze the S&P index to get a perspective of what the entire market is doing as a baseline to compare it to (S&P500 and the DOW30 are typically known as proxies for the United States Stock Market. Then after plotting features together to see if there was any correlation to the volume and the stock price. I went further to use linear regression in my stock trading strategy, basically I assumed that the asset prices would pull towards the linear regression in the long term, thus we utilize buying strategies when it signaled this. We were then able to compare the percent gain over the standard buy and hold strategy.

Tools

1. Numpy, Pandas - Data manipulation
2. Seaborn, matplotlib - Graphical/Visual insights through plotting
3. Datetime, Dateutil - To generate date/time insights
4. Sklearn - For Regressions
5. BeautifulSoup, Pickle, Requests - Webscraping needs
6. io, os - for File management (Exporting csv files)

Communication

The slides and visuals are presented in an orderly fashion and are also attached with this file.