Financial Modeling Research

By Jacob Cavner under Dr. Zachary Feinstein

Project Overview

- Develop single or multi-factor models in MATLAB
- Incorporate outside startup's data into the models
- Analyze how the data effects the predictive accuracy of our models

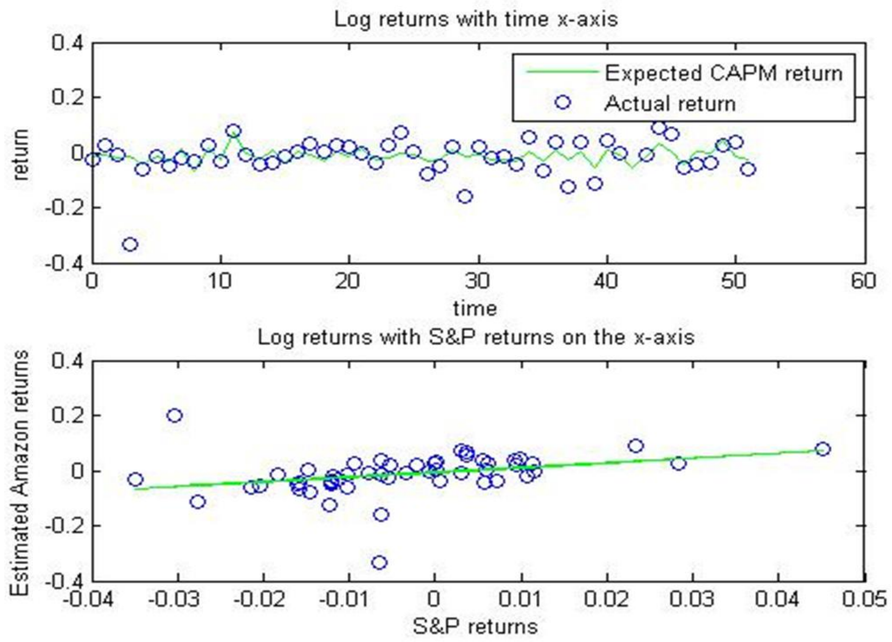
What are multi-factor models?

- A financial model (equation) that has multiple independent variables. The dependent variable is either an individual security (financial asset) or a portfolio of securities.
- Example:
- $r = b_3 * (K_m - R_f) + (b_s*SMB) + b_v$ x HML + alpha + R_f
    - r is the expected return of a financial portfolio

CAPM

- The first model I made
- $E(r)=alpha + beta*E(R_m)$
    - Alpha is the excess rate of returns
        - Calculated by taking the average of the difference between expected returns and actual returns
            - Very close to 0
- Beta is a coefficient for the volatility of a stock in relation to the market
    - If beta>1, then it is going to vary greater than the market. It will grow and shrink quicker than the market does

My CAPM



Modifications

- This original CAPM model was just using SnP data, not Expected Snp data.
- So, we used an algorithm to predict SnP price
- The process is called Geometric Brownian Motion

Geometric Brownian Motion model

- The upper and lower bounds were too wide, making it so our prediction accuracy was not very good.
- We are going to add Prattle's data to the expected SnP data to see whether or not it can improve the model