**Title:** Optimizing investment strategy using CAPM and other market anomaly

**Problem:** Predict an optimal way of choosing stocks using a mixed strategy with a lot factors.

Generally speaking, stock or portfolio return is associated with market risk free rate, the stock’s equity market premium, as well as its risk related to the market, according to CAPM (capital asset pricing model). This is the foundation of asset pricing theory and these data are accessible in any financial database. So theoretically speaking if we get these data, we can predict the future return and choose investment strategy using simple linear regression. However, because of the complex of financial market, there are a lot of market anomalies like momentum, IPO, profitability, distress risk and so on. Even though the abnormal phenomenon might be caused by people’s behavior and cannot be controlled or regulated, many researchers are still trying to explain them in a neutral way and want to predict the pattern from the data itself. So it would probably be a good idea to combine all these factors together to have a mixed strategy of predicting return and choosing investment portfolio.

**Importance**: One of the greatest difference between econometrics and machine learning is that the former one emphasis the relationship between different spaces, while the latter one is better for prediction without any causal or correlation inference. So for stock return prediction and strategy selection, ML has its own advantage than the traditional economics methodology.

**Input Space**: stock price, beta coefficient, risk premium, book- to-market ratio, company size, profitability, share issuance.

**Output Space**: predicted stock return, corresponding long-short strategy

**Data available:** Yahoo Finance

**Learning paradigm**: Supervised learning