Constructing a U.S. Equity Investment Portfolio – Long/Short Alpha Strategy

**Internal Memo – Please do not distribute**

Version Date: 08 January 2015

**Abstract**: The main objective of this project is to construct an investment portfolio of U.S. equity using multi-factor model (with the additional factor of peer-group reviews). This project first constructs a self-updated panel dataset from a number of data sources, including CRSP, Yahoo Finance, Fama-French Factors etc. Then peer groups of stock companies are formulated and the multi-factor models are applied within each window (i.e. 3 years). Using a rolling window technique, the key parameters of the model are calibrated using 20-year historical data (sampling period), with historical returns summarised in the report. Then the model is applied to the post-sample period. Lastly, the model is applied to real-time trading data, with report automatically generated by an app.

Author: Peter Lee

Table of Contents

Table of Contents - 2 -

S1. General Comments - 3 -

1.1. Change Log - 3 -

# General Comments

## Why use this investment strategy?

To actively manage an investment portfolio with the aim of earning excess return, there might be a number of approaches. This project favours the long/short investment strategy based on multi-factor models for the following reasons:

1. Long/short strategy has been proven to be working in the past. In fact, long/short strategy is the top strategy ranked by equal-weighted hedge fund performance data provided by Lippers Tass during 1980-2012.[[1]](#footnote-2)



The long/short strategy benefits in two distinct ways. First it amplifies the return when the market is normal (other than bear/bull). Most of the times the market does not show an obvious trend, thus shorting the under-performing assets tend to improve the fund’s return. Second, during bear/bull markets it tends to reduce the volatility of the funds’ return. During those extreme movements, gains and losses from long and short positions would offset, leaving less volatility in the portfolio. Note that many funds may choose to switch to a single strategy is in either a bear or a bull market.

1. Multi-factor models, amongst other models, have a good track of record in the past and is capable of explaining most of the variation in the return series. For example, since the introduction of CAPM in 1970s, it became widely used, and caused the small cap premium to fade out since 1980s.
2. Peer-review groups are able to identify ‘hot’ and ‘cold’ stocks, which is in line with the momentum theory. Some assets consistently outperforms the market over time whereas some others fail to do so. A possible explanation is that some aspect of the company is superior to its peers (i.e., management team, products etc.). These superior aspects has improved the competitive advantage over time and thus the performance of the stocks.

## Major steps of the project

The main purpose of this file is to document the analyses of the major components in this project. Specifically, the project comprises of the following stages:

1. Prepare data: The data is mainly sourced from CRSP (for historical returns). A self-updated algorithm needs to be in place to download from the Yahoo Finance to supplement CRSP data to keep stock returns up-to-date. In addition, a method is needed to scrape Fama variables from his website.
2. Define peer-review groups: The main contribution of the project over the classic models is about defining peer-review groups. A few attempts should be made, including group by industries, age of the firm and the size of the firm.
3. Apply models: Apply the multi-factor models to the stock companies within each window (i.e. 3 years interval during the sampling period). Rank the stocks by the estimated alphas.
4. Construct portfolio: Two sets of parameters need to be calibrated. The first set is the number of stocks in the portfolio. The second set is the weights of individual asset.
5. Rolling-window simulation: Provide simulation results for the post-sample period.
6. Apply model to real-time data: Apply the model to the real-time data (since January 2015), with report automatically generated by an app.

## Change Log

1. The reason to use equal-weighted return is to exclude the size effect, since short positions are typically traded in less volume, and is not typically used as the major trading strategy for large funds. The ranking of value-weighted returns shows that the long/short strategy is ranked the bottom 3rd. [↑](#footnote-ref-2)