**Factor Testing**

Factor analysis can be traced back Ben Graham who laid out the foundation of value investing. While there is a long history of using Factors to support investment decisions, Factor investing has recent exploded in terms of users and research.

ETF Global has been running their multi-factor models live on ETPs since 2012, covering Equity based products that are listed on a US Exchange.

The purpose of this project is to test the significance of ETF Global’s factor scores in generating alpha, utilizing two different ways 1) using regression based analysis on both the overall factor scores and the component scores that make up the overall factor score and 2) constructing Long/Short portfolios both at a full universe and segmented by Asset Segment (i.e. small-cap ETFs).

- Potential Regression Models:

OLS

Ridge

Regression Forests

Adaboost

This will be a team project with some individual components. Individuals will work on a sub-set of methods with the group doing the overall analysis work.

Team member(s):

Advisors: Chris Romano and Joey Gelin

The project will be grouped into 5 phases/milestones over a total of 14 weeks. Note that time estimates are to be used as a guide and are not hard deadlines.

1) Regression Setup: Estimated time X weeks

The framework setup is an important step in enabling consistent and reliable testing. It should be structured to easily add and test different models while producing the same output to ensure there is enough information to determine the significance of the factor scores. Initial setup and work will be done using OLS as the model. The framework will need to test the significance over different time frames.

- The framework will be developed using Python. Students should work as a team to layout and develop a common framework and code. The framework should include common input data interfaces and a common set of measures that will be used to test and compare the regression models.

2) Regression Testing: Estimated time X weeks

Using the framework setup in the previous phase, students will expand the code to include all methods that will be tested. The expansion includes running the methods to evaluate both the significance of the factors and to benchmark each method against each other.

- This phase should be more of an individual project. The students should split up the methods to allow them to implement at least one method.

3) Long/Short Rotation Setup: Estimated time X weeks

The third phase is to setup a framework to construct market neutral portfolios following the traditional monthly rebalance/reselection process. It should be flexible enough to test a large number of products or just a subset based on an attribute/label

- Phase 3 should be a group project.

4) Long/Short Rotation Testing: Estimated time X weeks

The testing phase will utilize the framework setup in phase 3 to test specific factors to determine if they produce alpha.

Phase 4 is another individual phase. Each student will receive different groups of products to test using the framework developed in phase 3.

5) Final Analysis

Final Analysis will consist of 1) Analysis if the factor scores are significant in predicting future returns and a comparison of each model and 2) Analysis of the returns from the Long/Short portfolios to determine if they produce positive returns.

- Students will work as a team to 1) review all work up to this point, 2) perform comparative analysis of both the regression models and the Long/Short portfolios and 3) Write a summery paper that describes the testing process and final analysis.