46-979 Asset Management, Final Project

Complete this assignment in a team of at least three and at most five students.

You will be assigned one of the four generic topics outlined next based on the quality of and preferences expressed in your letter of intent.

Deliverables:

- Team formation (due by noon on November 13): Submit a `CSV` file with a line for each team member in the following format:

  `andrewid, lastname, firstname`

- Letter of intent (due by noon on November 20): A one- or two-page document with the following information:

  1. Names of your team members.
  2. Your team's top two preferred topics.
  3. A brief paragraph for each of the two topics summarizing the main goal you aim to accomplish and the main steps you plan to follow to do that.

  The primary purpose of the letter of intent is to get you started on your project and to assign the topics. Although we hope to assign every team their top choice, we want to make sure that we have diversity in the topics. The decision to assign you your second choice may depend on the quality of your letter.

- Project highlights (due by noon on December 10): An eight-page (or shorter) slide deck (pdf format) for a **six**-minute presentation of your project. Please DO NOT include the names of your team members in the slide deck. The eight-page is a hard constraint. If you submit a document with $N > 8$ pages, then pages $9, \ldots, N$ will be deleted and you will have to manage only with the first eight pages during your presentation.

  All of the slide decks will be made available in canvas by 5pm on December 10. Students are expected to read all slide decks by the beginning of class on December 12. There will be an in-class exercise on December 12 based on this material. In addition, a few teams will be selected to present their highlights in class on December 12.

- Project write up (due by noon on December 14): A ten page (or shorter) final report with the following format:

  1. Executive summary
  2. Project description
  3. Methods
  4. Results
  5. Conclusions

  Again the ten page limit is a hard constraint. If your report is longer, your evaluation will be based solely on the content of the first ten pages.

First Suggested Topic: Factor Timing

There is a current and interesting debate about the potential merits of factor timing. On one side of the debate, some major players like Rob Arnott and his firm Research Affiliates believe that factors can become expensive and that investors should time their exposures to buy low and sell high. Arnott and his co-authors have made this argument together with suggestions for factor timing in a series of papers. On the other side of the debate, Cliff Asness, founder of AQR Capital Management, argues that factor timing is deceptively difficult. Asness has challenged the methods and arguments proposed by Arnott. In another series of papers Asness and co-authors argue that factor timing may be about as difficult as market timing.

Project

The above debate suggests the following kind of class project. Take one or more factors like momentum and/or value. Test at least three different timing variables and demonstrate whether the timing variable helps or not with statistical significance. One of the timing variables should be based on recent factor performance so the timing strategy would dial down the risk budget when the factor returns are weak, and dial it up when they are strong. Another timing variables could be based on some observable macroeconomic variable that interacts with the factor. For instance, interest rates, equity market returns, etc. State the timing variables you plan to use in your letter of intent.

The idea is similar to what you explored in Homework 1 but with the goal of timing one or two factors instead of timing the market. Whatever factor timing strategy you design must be evaluated out-of-sample.

Related references:

- R. Arnott, N. Beck, V. Kalesnik, and J. West. "How Can Smart Beta Go Horribly Wrong?" Research Affiliates, 2016.
- R. Arnott, N. Beck, V. Kalesnik, "Timing Smart Beta Strategies? Of Course! Buy Low, Sell High!" Research Affiliates, 2016.
- R. Arnott, N. Beck, V. Kalesnik, "Forecasting Factor and Smart Beta Returns" Research Affiliates, 2017.
- C. Asness, S. Chandra, A. Ilmanen, and R. Israel, "Contrarian Factor Timing is Deceptively Difficult," *Journal of Portfolio Management,* Special Issue 2017.
- J. Bender, X. Sun, R. Thomas, V. Zdorovtsov, "The Promises and Pitfalls of Factor Timing," Jacobs Levy Equity Management Center, April 2017
- Various entries in "Cliff's perspective" blog (at AQR web page):
  - Factor Timing is Hard, March 2017
  - A Fanatic is One Who Can't Change his Mind and Won't Change the Subject, July 2017

Second Suggested Topic: Active Share

Another interesting debate concerns the concept of "active share", introduced by Martijn Cremers and Antti Petajisto, and its ability to predict performance. On the one hand, Cremers and Petajisto argue that funds with the highest active share significantly outperform their benchmarks, both before and after expenses, and they exhibit strong performance persistence. They also argue that funds with the lowest active share underperform their benchmarks. On the other hand, a recent paper by Frazinni, Friedman, and Pomorski argues that active share correlates with benchmark returns but does not predict actual fund returns; within individual benchmarks. Frazzini et al argue that active share is as likely to correlate positively with performance as it is to correlate negatively.

Project

The above debate suggests another kind of class project. Using the most up to date data, test whether active share predicts performance. In other words, see what side of the debate is supported by the data. Cremers's "ActiveShare.info" website `https://activeshare.info/` as well as his "Active Share" website `http://activeshare.nd.edu/` seem to offer a wealth of data to test the claims in both sides of the above debate.

Pick at least five funds that use the same benchmark but with sufficiently different active shares. Test whether active share predicts performance for these funds. State the funds that your team will analyze in your letter of intent.

Related references:

- M. Cremers and A. Petajisto, "How active is your fund manager? A new measure that predicts performance", Review of Financial Studies, 22, 2009
- M. Cremers, "Active Share and the Three Pillars of Active Management: Skill, Conviction and Opportunity," Financial Analysts Journal, 2017
- A. Frazzini, J. Friedman, and L. Pomorski, "Deactivating Active Share," Financial Analysts Journal, 2017

Third Suggested Topic: Capacity of a Trading Strategy

A quantitative asset manager seeks an optimal trade-off among three competing concerns:

- Maximize expected portfolio return
- Minimize portfolio risk
- Minimize trading costs

We have discussed a number of factors that have a persistent premium (size, value, momentum, quality, betting-against-beta). Most academic models focus on the first two of the above concerns. However, trading costs can be a significant determinant of portfolio performance, especially for portfolios with a large number of assets.

Project

Construct a factor-based investment strategy and explore different approaches to manage trading costs. To that end, you can explore any combination of the following:

First, choose a concrete risk factor such as value, size, momentum, or betting-against-beta. The last three have the advantage that they pose relatively low data demands. Use one of the approaches discussed in class to construct and maintain factor mimicking portfolios. Choose some fixed time frame (weekly, monthly, quarterly, etc) to rebalance your portfolio. Evaluate the performance of your strategy without any further considerations, that is, without transaction costs. You could either choose to manage a long-only portfolio relative to a benchmark, or a benchmark-neutral long-short portfolio. State the risk factor and kind of portfolio that your team plans to use in your letter of intent.

Second, assume the same level of proportional transaction cost applies to every transaction and re-evaluate the performance of your strategy. Choose various level of proportional transaction costs: 10 basis points (bps), 20 bps, 50 bps, etc. Determine how high can the proportional transaction costs get before the premium of your strategy vanishes.

Third, tweak your investment strategy to be mindful of transaction costs. For example, assume a proportional level of transaction costs and play around with the frequency of portfolio rebalancing and with some kind of turnover constraints.

If you want to get more ambitious you could assume quadratic transaction costs. This corresponds to the case when market impact is linear, that is, the per-dollar transaction cost is proportional to the volume transacted. In this case you can investigate what is the "capacity" of your strategy. That is, how much capital can you invest before the premium disappears.

Related references:

- L. Sneddon, "The Dynamics of Active Portfolios", Westpeak Global Advisors (http://www.northinfo.com/documents/180.pdf)
- N. Garleanu and L. Pedersen, "Dynamic Trading with Predictable Returns and Transaction Costs," Journal of Finance, 2013.

Fourth Suggested Topic: Tax-Aware Investing

Classical models used in portfolio optimization focus on finding the optimal tradeoff between return and risk. A more complete model takes into account the impact trading has on returns. For a taxable investor, such models include the tax consequences of trades. However, the structure of tax rules poses an interesting challenge. In particular, as discussed in class, different tax rules apply to ordinary income, capital gains, and capital losses depending on some timing considerations. For instance, the tax rate for capital gains for securities held for less than a year (short-term gains) is higher than that for securities held for a year or more (long-term gains). The same applies to losses. Furthermore, the wash-sale rule prevents an investor from claiming the tax rebate on a realized a loss if the same security is purchased within 30 days before or after realizing the loss.

The following are commonly use rules to manage taxes:

- Realize losses and defer gains on any security.
- Sometimes realize long-term gains to reset the tax basis of a security.
- Keep track of the acquisition date and price of each transaction lot.

Project

Consider a taxable investor interested in building a tax-efficient portfolio strategy that tracks a well-known market index (for example, S&P 500). She rebalances her portfolio on a regular schedule (say, monthly or quarterly). Determine the optimal level of aggressiveness in realizing gains and losses that maximizes post-tax returns over the investment horizon.

Some comments and clarifications are in order:

1. Index tracking: Limit the active risk of the portfolio with respect to the benchmark index. You can do this using a factor risk model if you have access to one (or can build one), or by limiting the active weight on securities, industries, etc.

2. Transaction costs: Ignore the impact of non-tax-related trading costs for the purposes of this project.

3. Base case: Consider naive loss harvesting that discourages gains and encourages losses as the base case and explore enhancements to this approach.

4. Investment horizon: Consider an investment horizon of at least 5 years and start from an all cash portfolio of, say, \$10M. The initial cost basis of the portfolio will be 100% of its market value.

5. Consider several alternativeness for the purpose of the portfolio.

   (a) Income generating portfolio (regular cash outflows of, say, 5% per year of the initial investment). Assume that the whole portfolio will be liquidated with tax consequences at the end of the investment horizon for this scenario.

(b) A portfolio intended for charitable giving (no outflows and no tax consequences for the final portfolio).

Related references:

- K. Thomas, "Capital Gains Minimal Taxes", Fairmark Pres 2015.
- D. Stein, H. Vadlamudi, and P. Bouchey "Enhancing Active Tax-Management through the Realization of Capital Gains"

  https://customcore.parametricportfolio.com/Content/Download?filename=enhancing%20active%20tax-management.ca.pdf