FBE 551 Final Project
Due on 12/1/2024 by end of day
In-class presentations on 12/2 and 12/4

Your final project is done as a team exercise, and consists of the design, research, testing, and implementation of an original quantitative investment strategy. Aim for a report of approximately 10 pages in addition to the submission of all data and Python code used in the report. We will also do a short (5-10 minutes including Q&A) presentation of your results in class. You should turn in your presentation slides as part of the deliverables. As with homework, your project grade will be determined by several factors. This includes the quality of your report in terms of both the concept and the execution, and the quality and clarity of your in-class presentation. It also includes a peer evaluation.

The key word here is "original." The whole point of this course is that you are trying to use quantitative techniques to identify new sources of alpha. That said, there are many things that qualify as original. Most projects are simply modifications or combinations of existing strategies. That is fine for our purposes. A more original strategy is better, however. Your project should *not* be just a regurgitation of one of the papers/strategies we have already covered in class. If you modify or combine a strategy we discussed in class, you should spend a bit of time in your paper discussing the original strategy and why your modification to it makes sense.

Your strategy may be based on a cross-sectional equity type along the lines of what we discussed in our factor-oriented and smart beta work; it could be long-only or long/short; it could be creating portfolios at the monthly, weekly, daily, or intra-day horizon; it could be asset allocation or time-series prediction of a single asset, on a monthly/weekly/daily/intraday basis. You can use any of the data we have seen in class, any other data you may want to gather from WRDS or other data vendors, or additional data as you see fit. If you are interested in a certain type of data but unsure about where you might find it, ask me and I may be able to help.

Your paper should discuss the following elements: "Design" refers to the idea behind the strategy. Why do you think it might work? What assets are you going to trade, and how will you trade them, etc.? Most of this will borrow from ideas that we discussed in class. A more ambitious paper will probably include some motivation from sources not covered in class.

"Research" is the work done in order to compute your strategy returns. This includes cleaning and organizing the data. It could also include computing summary statistics or that performs a preliminary statistical analysis to check a key assumption.

"Implementation" is the analysis of the actual strategy. The centerpiece here is the backtest of your strategy. This should include various measures of performance evaluation. A more ambitious paper would examine whether different implementations of the strategy generate similar results or very different results (i.e., do different specifications of "value" lead to similar results in a backtest?). It could also include an analysis of results over different sample periods or for different sets of stocks, or some other sort of out-of-sample evidence. If trading costs are of a concern, you should make some attempt to measure and discuss trading costs.

"Testing" is about the statistical significance of your results. It is also about comparing your main results to others. For instance, if your finding is that a strategy that combines value with momentum is profitable, a good question to ask is whether it is more profitable than a strategy that only uses value or only uses momentum.

Longer is not better. If you have an original idea that requires little explanation, then shorter than 10 pages is possible. This is unlikely to be the case, however, because most ideas are not that simple, and so they take more pages to explain. Your report should be detailed enough that a reader could replicate it.

I expect that a few of these pages will be filled with tables or plots. More than a few tables and plots are fine if justified, but the report will probably have to be longer than 10 pages.

To get a top grade, you need to have a good idea, and it needs to be executed properly, with appropriate performance evaluation metrics. I plan to look at your Python code, so it should be correct and reasonably readable. Your code should include Markdown descriptions of your process and also display the main results that will be included as tables in your paper.

Your project will also include a peer evaluation. In most cases, this will not affect your grade. I include this for unusual cases in which there is a consensus that a team member is not making a meaningful contribution.

In terms of writing style, let me offer a few suggestions: First, write the paper, especially the introduction, at a level that would be appropriate for your classmates, who have seen the material we covered this semester. Don't give a background on quant investing or the investment management industry. Assume we know the basics. Get to the point within the first paragraph. What do you do and why? Why do you expect it should produce alpha? If it is based on prior strategies or papers, give a short discussion of those here.

Put your strategy description in one place, where you spell it out in detail. Use equations, timelines, or other charts if necessary. Be precise about lagging, sample periods, the data frequency, etc. Be especially careful in describing the timing of your strategy. Relative to the date on which you make an investment, when are your model's parameters estimated? What data you using to determine other key model inputs? What securities are you trading? Be careful to show that you are not making any of the backtesting errors we have discussed in class.

You don't need to tell me about your Python code in the text, except maybe to tell me that you are using an unusual package (e.g., Keras). Code should stay in a Jupyter notebook. Similarly, you should not show me your raw data in the text. The reader does not need to know what your dataframe looks like. You can present a table that summarizes your data if you think that would be helpful. Mainly, however, we are interested in results.

Finally, your goal is not to tell me all the things you tried. Your goal is to inform the reader about your findings, not your personal journey. Just get to the point!