UNIVERSITY OF ILLINOIS AT CHICAGO
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Department of Finance

A Research Project for Portfolio Analysis
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General Instruction: This project should be done in a group and handed in as a group. Choose either Project A or Project B, which you are more interested. Everyone in the group will receive the same grade on the project. However, free riders of the project can be expelled from the group. **The final score is determined by the scope of the project, the robustness of the methodology, the completeness of the analysis, and the effectiveness of the presentation.** Aim for a 30-minute presentation and a 10-minute Q&A. The presentation practice is highly recommended to check if the main content can be covered in a time manner during the formal presentation. (You don't have to submit a written report but the presentation slides.)

Objectives: **To learn data analysis in a large scale, to understand the insights about an investment strategy construction, and to identify economic (risk) factors potentially affecting performance of your strategy or the analyzed equity fund strategy.**

Project A.

Fine-tuning Pair Trading Strategy: Using Information of Firms' Competition & Industry Structure

You are expected to systematically examine firms' competition within an industry in a great detail. Analyze business similarity and complementarity among firms in the industry in order to define a firm's rivals and allies. Construct a long-short strategy by taking into consideration of the insights about the relative competitive position of the firm versus its strategic players in the industry.

Specific Research Notes:

1. Choose an industry which you are interested. You have to explore it in a great detail mainly in business similarity and complementarity as well as a firm's market position within the industry. You have to access firms' 10-K annual filings on the SEC Edgar website to do it.

2. To know more about business similarity and complementarity, you are expected to read "Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis" by Hoberg and Phillips (2010). They use web crawling and text parsing algorithms that process the text in the business descriptions of 10-K annual filings on the SEC Edgar website. They calculate firm-by-firm pairwise similarity scores by parsing the product descriptions in Item 1 or 1A from the firm's

10-Ks and forming word vectors for each firm to compute continuous measures of product similarity for every pair of firms in each year.

3. You are strongly encouraged to explore an innovative way to identify business similarity and complementarity. Can you effectively apply your method to all firms in every industry?

4. In the long-short strategy, you have to include at least two firms, a focal firm and its related firm, in a long portfolio, and two firms, the focal firm's two greatest rivals, in a short portfolio. *Back-test your investment strategy to verify if the result is what you claim for*. In the back tests, you can **only** use the information available up to the time of the portfolio formation and examine profitability of your strategy on a basis of ***out-of-sample* test**. In order to have the statistics for the tests, you have to systematically and consistently update your portfolios or strategies *at least every year* if you use the similarity scores provided by Hoberg and Phillips (2010) directly. At the end, you have to do at least **risk exposure analysis** using Fama-French 3-factor model plus momentum.

5. You might want to provide **the turnover rate of portfolio compositions** to gauge the potential transaction cost of your strategy. How often is the relationship between a focal firm and its allies or between a focal firm and its rivals changed?

Project B.

Reverse Engineering on the investment strategies implemented by US open-end equity funds.

You are expected to explore investment strategies of equity funds with a minimum $100 million of total asset under management by analyzing their returns and portfolio holdings. Choose top and bottom two performing funds with the same Lipper investment style at the end of each year and examine their investment strategies over the prior 3 years. Can you identify common factors to explain what went right or wrong in their strategies?

Specific Research Notes:

1. Access the CRSP Survivor-Bias-Free Mutual Fund database via WRDS web server for equity funds' returns, portfolio holdings, and other information.

2. The description of Lipper classification codes can be found in http://www.crsp.com/products/documentation/lipper-objective-and-classification-codes. Choose funds from one of the 12 Lipper style groups: LCCE (Large-Cap Core Funds), LCGE (Large-Cap Growth Funds), LCVE (Large-Cap Value Funds), MCCE (Mid-Cap Core Funds), MCGE (Mid-Cap Growth Funds), MCVE (Mid-Cap Value Funds), SCCE (Small-Cap Core Funds), SCGE (Small-Cap Growth Funds), SCVE (Small-Cap Value Funds), MLCE (Multi-Cap Core Funds), MLGE (Multi-Cap Growth Funds), and MLVE (Multi-Cap Value Funds).

3. Perform your analyses based on both a fund's returns and portfolio holdings. For example, based on the fund's returns, you can perform risk exposure analysis using Fama-French factor models or attribute the fund's investment styles based on Sharpe's asset allocation model. Based on the fund's portfolio holdings, you can examine types of stocks held and explore potential investment strategies used by the fund manager.

4. Do extreme performing funds persist over years?

Common Research Notes:

1. There is a great deal of subjectivity in this project but you should concentrate on supporting your conclusions. Start the project early. Think about what you are doing, why, and how. Any reference you use must be given a proper citation.

2. To have a meaningful statistical inference, you need to have a period of at least 10 years for the testing. Thus, the latest year you have to start to construct your strategy or examine equity fund strategies is Year 2008.

3. You may directly use the CRSP/Compustat Merged database (CCM), which links CRSP market/corporate action data with Compustat fundamental data. IBES provides consensus and detail forecasts on earnings from security analysts. Mutual fund data: CRSP Survivor-Bias-Free US Mutual Fund Database; Thomson-Reuters Mutual Fund Holdings database. They are available at
   https://wrds.wharton.upenn.edu/wrdsauth/members.cgi
   Username: uicfin20
   Password: to be announced in class.

8. Professor French's web site provides a lot of useful data such as common risk factors, portfolio returns sorted by firm characteristics, and different industry classifications.
   http://mba.tuck.dartmouth.edu/pages/faculty/ken.french

References

1. Chan, Louis K. C., Hsiu-lang Chen, and Josef Lakonishok, 2002, On mutual fund investment styles, *Review of Financial Studies 15*, 1407-1437.
2. Hoberg, Gerard, and Gordon Phillips, 2010, Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis, *Review of Financial Studies 23*, 3773-3811.
3. Hoberg, Gerard, and Gordon Phillips, 2016, Text-Based Network Industries and Endogenous Product Differentiation, *Journal of Political Economy 124*, 1423-1465.
4. Sharpe, William F., 1992, Asset allocation: Management style and performance measurement, *Journal of Portfolio Management (Winter)*, 7–19.

https://en.wikipedia.org/wiki/Standard_Industrial_Classification
https://en.wikipedia.org/wiki/Trigonometric_functions#Sine.2C_cosine_and_tangent
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"In the corporate world, you spend half your life making forecasts and the other half explaining why that forecast was wrong."