香港中文大學（深圳）
The Chinese University of Hong Kong, Shenzhen

FIN 3080 Investment Analysis and Portfolio Management

SPRING 2022 || CUHK(SZ)

Project

Instruction:

1. Due: **Thursday, 12:00 am May 12th, 2022.** Late submission of assignments will not be accepted. You can write the report in English or Chinese.
2. Please submit your answer in one PDF (name your file with the format "ID+Name").
3. Submit the **code files** as an attachment.
4. A mark of zero (0) should be awarded for the assessment in which the plagiarism or fabrication was found to occur.

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1. We want to use past return skewness and kurtosis to construct trading strategies as we did in project 2 case 2. Please download the return data of all the mainboard and GEM board stocks from January 2015 to the most recent. For the first trading day in each month, please use the daily returns over the past three months to calculate the return skewness and kurtosis for each stock. Then, in each month you sort stocks by skewness and split them into ten groups according to their skewness deciles (so your portfolios actually start from April 2015). Next, you can construct ten monthly portfolios with pure long positions by holding stocks within the same group (and rebalancing them) every month plus a long-short portfolio by longing firms with the highest (or lowest) skewness and shorting firms with the lowest (or highest) skewness (and rebalancing the positions) every month. Finally, report the monthly average raw returns and calculate abnormal returns with the **Fama-French three-factor model** for all 11 skewness-based portfolios. Repeat these steps with kurtosis. (70%)

2. Post Earning Announcement Drift (PEAD) is one of the most classical phenomena in asset pricing; it stands for "*the tendency for a stock's cumulative abnormal returns to drift in the same direction of an earnings surprise for several weeks (even several months) following an earnings announcement*." (Wikipedia). Let us use the event study methodology taught in the lecture to examine whether the PEAD exists in China's A-share markets following the steps outlined below. (30%)

Step 0: Set data period as [2013H2 (the second half year of 2013), 2020H2 (the second half year of 2020)] and download the daily return data for all the main board stocks (excluding financial stocks) within this period.

Step 1: Collect earnings per share ($EPS_{i,t}$) data in each half year period t (t indicates the half year, such as 2013H1, 2013H2, 2014H1,…, etc.) for each firm i. (Remark: listed firms are required to publish financial announcements quarterly and each statement should report the accounting terms (like the EPS here) as of the ending of that quarter. For example, in firm A's 2015H1 (i.e., 2015Q2) report, it should disclose A's EPS as of 2015/6/30. The 2015/6/30 or 2015H1 here is called the **accounting deadline** for the announcement; in other words, t here indexes the accounting deadlines for all interim and annual announcements over the sample period. Beware, an announcement can be made several weeks later than the accounting deadline. For example, company A's interim report in 2015 could be released in, say, 2015/7/26. The 2015/7/26 here is called the **announcement date** and the announcement date is the real 'event date', because that is when investors get informed of the firm's past performance. CSMAR provides direct access to EPS data and you can find them in the 'Index per Share' table and you can find real announcement dates in the 'Statements Release Dates' table. Here we restrict attention to interim (Q2) and annual (Q4) reports only, so feel safe to drop Q1 and Q3 reports from the sample.)

Step 2: Calculate unexpected earnings ($UE_{i,t}$). To gauge the earning surprise from EPS, we need a proxy for expected earnings per share (as a benchmark). Due to the seasonality effect, for each EPS at t, we use the EPS at $t-2$ as the expected EPS, (e.g., for EPS of the first half year of 2019H1, the EPS of 2018H1, rather than the EPS of 2018H2, should be taken as the benchmark) i.e.,

$$UE_{i,t} = EPS_{i,t} - EPS_{i,t-2}$$

Step 3: Calculate standardized unexpected earnings (SUE_{it}). Next, we use the standard deviation of UE over the past two years (i.e., $UE_{i,t-3}, UE_{i,t-2}, UE_{i,t-1}, UE_{i,t}$ (for $t \geq$2015H1)) to calculate the standardized UE as follows:

$$\sigma_{i,t} = STD\left(UE_{i,t-3}, UE_{i,t-2}, UE_{i,t-1}, UE_{i,t}\right),\ SUE_{i,t} = \frac{UE_{i,t}}{\sigma_{i,t}}.$$

Step 4: Sort stocks into 10 portfolios based on the standardized UE in each half year t.

Step 5: Now switch to the daily return data and the forementioned announcement dates now kick in. For each firm's each earning announcement at t, collect the daily return from 120 trading days before the earning announcement date to 120 trading days after the earning announcement date. (Remark: we choose [-120, 120] as the event window because there are 251 trading days in a year)

Step 6: For each firm's each earning announcement, first calculate daily abnormal returns by subtracting market index returns from daily returns (for each day) in the event window (i.e., the [-120, 120] interval around the announcement date); then calculate the cumulative abnormal returns for each

stock by summing over daily abnormal returns from the -120th trading day before the announcement day to the 120th trading day after the announcement day. Now we have cumulative abnormal return time-series corresponding to each firm's each announcement. (Remark: the real time index of these series can be very different but they all share the same event time index, i.e., {-120, -119, …, 0, 1, …, 120}; you may use the exchange-aggregated market returns provided in the 'Stock Trading' table on CSMAR as market index returns.)

Step 7: Recall that we have split stocks into ten portfolios for each half year t in (4); now we calculate the cumulative abnormal return for each portfolio at each half year t by averaging the cumulative abnormal return series from firms within the same portfolio at t. For example, portfolio 1 that contains company A and B. Then at 2015H1, we simply average A and B's return series to obtain portfolio 1's return series at 2015H1. (Remark: firm A and B's announcement date for the 2015H1 report can be different; for example, firm A's 2015H1 report is released on 2015/7/26 while firm B's 2015H1 report is released on 2015/7/2; then 2015/7/26 and 2015/7/2 are the real event date for A and B respectively. In other words, we treat the announcement date as the real event date and use the accounting deadline to merge firms' announcements (and use the event time to aggregate time series).)

Step 8: Finally, for each portfolio at each half year t, we have a return time series index from –120 to 120. By averaging these series from 2015H1 to 2020H2, we can obtain ten return time series corresponding to ten portfolios and plot ten time series in a figure similar to that on our lecture note ((In)Efficient markets_L9) page 26.