

# **FIN3080 Assignment 5 Report**

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## **1 Introduction**

### **1.1 Programming language**

In this assignment, I use python to do all the research.

### **1.2 Data source**

All data are from CSMAR. The detail of each data file is shown when I load them.

## **2 EPS data preprocessing**

### **2.1 About the statment type**

For the data file with two different statement types, I choose "A", that is consolidated statements. For consolidated statements reflect the financial position and operating results of the entire enterprise group, but parent statement only reflects the business status of the parent company.

### **2.2 About the abnormal data**

I drop the item that the firm is abnormal (ST or PT) in the accounting date.

## 2.3 Change the frequency of EPS data

I change the data frequency from quarterly to semi-annually. As the eps data is accumulative in a year, so I use the quarter 2 and the difference of quarter 2 and quarter 4 to construct the semi-annual eps data.

## 2.4 Derive unexpected earnings

I use the following formula to derive unexpected earnings:

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

## 2.5 Derive e standardize unexpected earnings

I use the following formula to derive e standardize unexpected earnings:

$$SUE_{i,t} = \frac{UE_{i,t}}{\sigma_{i,t}}$$

where the  $\sigma_{i,t}$  is the standard deviation of the last 4 semi-annual of the unexpected earnings.

I also calculate the decile of the SUE by accounting dates.

# 3 Stock return data preprocessing

## 3.1 About the market return

I use equal weighted return of all the A shares in the Shanghai and Shenzhen Exchange. For the behind operations are all simple average.

## 3.2 Derive daily abnormal returns

I use the following formula to derive daily abnormal returns:

$$AR_{i,t} = r_{i,t} - r_{m,t}$$

in which  $r_{it}$  is firm i's stock return at time t and  $r_{mt}$  is the market return at time t.

### 3.3 Data preserving

I do not preserve all the data in one csv file for the number of items in the data is too huge. I choose to preserve the data in different csv files by accounting dates.

## 4 Main analysis

### 4.1 Derive cumulative abnormal returns and drop useless data

Here I would like to derive (simple) cumulative abnormal returns (CARs) for individual stocks. The formula is as follows:

$$CAR_{i,[t_1,t_n]} = \sum_{j=1}^n AR_{i,t_{j'}}$$

in which  $AR_{i,t_{j'}}$  is the abnormal return. For each firm's each EPS announcement event since 2015, we consider a 241-day window starting from the 120 days before the announcement and 120 day after the announcement (denoted by  $[-120, 120]$ ), and derive CARs at each trading day within these windows. If the announcement date is not a trading day, I use the nearest trading day after the announcement date (that is the first day the investors begin to react to this information).

So, for the statement data that pulished after 2022-07-08 is useless, I drop them. There are some data missing issue. When I occur such issue, I drop this event.

### 4.2 One layer mean

I calculate the mean of difference events by accounting dates and take it as the first layer mean.

### 4.3 Double layer mean

I calculate the mean of difference events by accounting dates and deciles and take it as the couble layer mean.

#### 4.4 The result

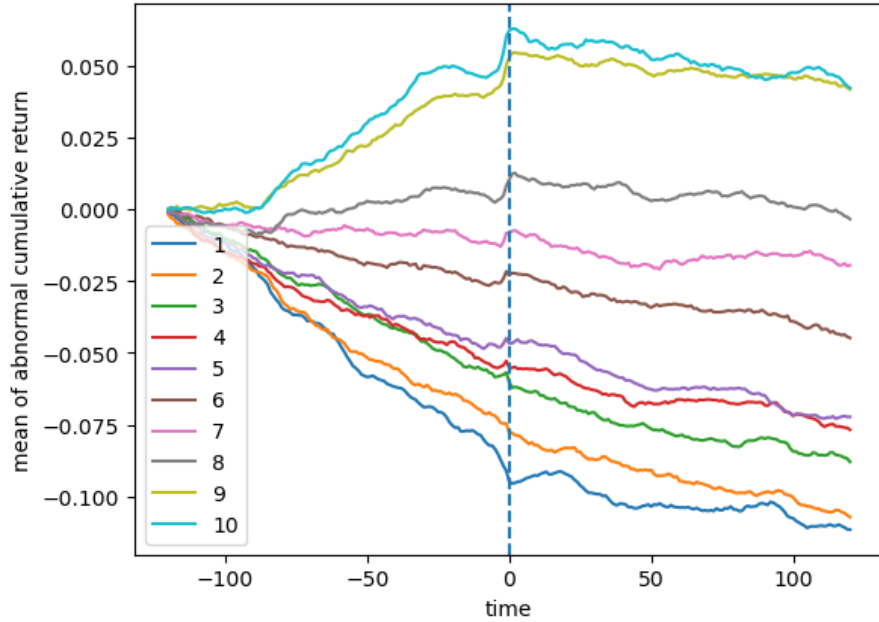


Figure 1: The time series of abnormal cumulative return in the event window

From the above graph, before the event, the higher the SUE is, the higher abnormal cumulative return is. Then, we can see a significant jump after the event is announced in portfolio 6~10. For portfolio 1~5, the abnormal cumulative return has not so significant jump or has a totally opposite direction jump (portfolio 1). For the reason behind it, I think it is because

1. people are sensitive to good news but not so sensitive to bad news, which means this market is not semi-strong efficient.
2. It is not so convenient to short in Chinese stock market. Even though some smart investors find the bad news, they do not willing to short the stock to make profit for the system limit and the latent risk.

Then, after the day just behind the announcement. The abnormal cumulative return of portfolio 6~10 is decreasing, which means investors overreact to the good news, which let the stock price drift down and go back to a recognized level. The abnormal cumulative return of portfolio 1~5 is decreasing too, which is an indicator that the market is trying to absorb the bad news and let the stock price drift down slightly.