**Chapter 4: Marked efficiency - part 2**

Exercises - solutions

1. No, the EMH does not say that excess returns are impossible, it says that excess returns cannot be systematically earned by using the available information set. In view of the very large number of investors, it is to be expected that a few will be lucky a number of times in a row. Similarly, a few people will be very unlucky and lose large amounts on the stock market.

2. (a) No, it is to be expected that news reaches the stock market before it materializes in earnings. It would contradict the EMH if it were the other way around (that earnings predict nest quarter's stock returns).

   (b) No, you have tried 1000 different filter rules. Using a 5% confidence interval with a two-sided test you would expect to find $\pm$ 25 rules with a significantly positive return and the same number with a significantly negative return, based on pure chance. If you re-run the analysis on a different period you will probably find about the same number of significant results but in different stock-rule combinations.

   (c) Yes, the stocks of smaller, infrequently traded companies usually have higher transaction costs, e.g. a larger bid-ask spread.

   (d) Predictability contradicts the EMH but in this case it is obvious that the relation you found is spurious. Re-testing on a different dataset and/or period will almost certainly not reproduce similar results. However, the same conclusion would apply if your computer happened to find two variables that look plausible on first sight.

3. If the ranking is over a short period (0.5-1 year is typical), the benchmark index would be somewhere in the middle. Since excess returns are random, about equal proportions of the funds will over- and under-perform the index. As the period becomes longer, the index would move higher up on the ranking. Excess performance is not persistent so that good and bad years alternate. In the (very) long run few, if any, funds will outperform the index, so that the index will be (almost) on top.

4. Unknowledgeable investors are indeed protected in an efficient market, but only to a certain degree. Buying and selling at market prices will be fair, i.e. there is no mispricing that other, knowledgeable investors can profit from. But if you offer to sell below market prices (e.g. by making a typing error) other investors will quickly profit from your mistake. Efficient markets offer no protection against excessive trading and no reward for the unsystematic risk of poorly diversified portfolios.

5. No, the good news can have reached the market gradually in other forms, e.g. news that large contracts were concluded, personal was recruited, new plants were being build, etc. The reflection of this news in the stock price does not contradict the EMH.

6. No, the market can have expected a larger increase in earnings based on the news that became available earlier.

7. To calculate the abnormal return we first have to calculate the normal return with the market model. Estimation of the market model for DetNor over April-May gives: $r_{DetNor} = 0.339 + 0.659 \times r_{OBX}$. The return of the OBXindex on the announcement day is 1.46% so DetNor's normal return is $0.339 + 0.659 \times 1.46 = 1.30$. DetNor's observed return on the announcements day is 8.65%, so the abnormal return $8.65 - 1.3 = 7.35\%$.

8. (a) Dividend (omission) announcements are public information other than prices and volumes: Szewczyk et al. test semi-strong market efficiency. Their results do not contradict the Efficient Market Hypothesis (EMH): CAAR are stable before the event, there is a sharp decline on the event date and again hardly any change in CAR after event date. This is shown in the data but it becomes more clear if we plot CAAR over time. The figure shows an efficient marked response to new information. The usual statistical assumptions apply.
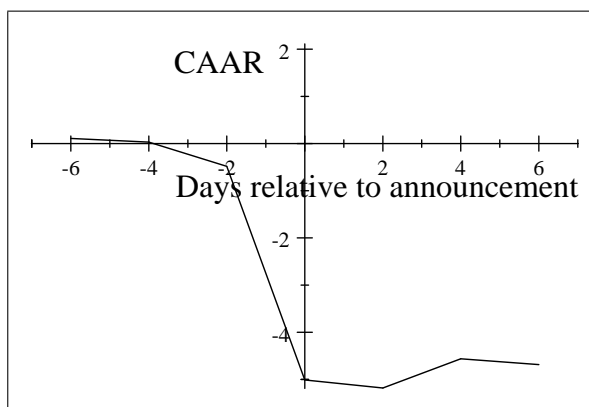
CAAR for firms announcing dividend omissions

(b) No! In order to say something about strong form market efficiency it has to be tested. For example by taking a sample of insiders, analyse their investments, look at the excess returns, etc. It is not possible to draw conclusions about strong form efficiency from a test of semi-strong efficiency.