Chapter 4: Marked efficiency

Exercises

1. In September 1998 the investment banking and securities firm Goldman, Sachs & Company cancelled its plan to go public, i.e. to offer shares to the public. The decision was made after a sharp drop of 25% in the results over the third quarter. Goldman's co-chairman and chief executive Henry M. Paulson Jr. said to the New York Times: "With the volatility we have, the falling valuations (of other investment banks) and uncertainty of earnings going forward, I can't imagine that we would advise a client that this is a good time to go public for a financial service company". What does the EMH say about Goldman's decision to cancel the stock issue because of falling valuations?

2. What does the EMH imply about the Net Present Value (NPV) of the purchase or sale of a security on an efficient market?

3. Suppose that the stock prices of a fertilizer producer move in the same cycles as the fertilizing seasons, high in spring and summer, low in fall and winter. Explain how trading will eliminate the cyclical pattern.

4. It is sometimes argued that markets cannot be efficient because only a small proportion of investors follow the information on a stock and an even smaller proportion actively trade in a stock on a day or in a week. Is this argument correct?

5. Investors can disagree strongly about the implications of information for the price of a particular stock. Therefore, the information cannot be fully reflected in prices and markets are not efficient. Is this argument correct?

6. You are planning to visit Amsterdam and in preparation for the trip you collect (among other things) some data about the local stock market, viz. the returns of five major stocks and the index. You analyse the data in different ways. First, you plot the percentage daily returns of the stocks and the index against their return on the next day. Figure 1 shows two such plots, one for Air France-KLM (ticker: AF) and one for the AEX index (ticker: AEX). The AEX index consists of the 25 most actively traded securities on the Amsterdam Stock Exchange.

   (a) Do these plots reveal market inefficiency? Explain why.

   (b) As an aside, what else do these plots show?

   Next, you calculate autocorrelation coefficients for the stocks and the index, i.e. correlation coefficients between the returns today and tomorrow. The results are presented in Table 1.

   (c) Does Table 1 reveal market inefficiency? Explain why.

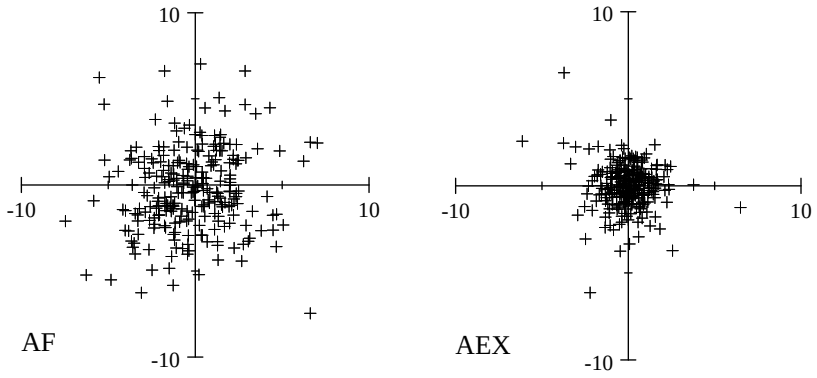

Figure 1: Return day t (x-axis) vs. day t+1 (y-axis)

Table 1: Autocorrelation coefficients

Stock	ticker	$\rho_{r_t, r_{t-1}}$
Air France-KLM	AF	.070
BosKalis-Westminster	BOKA	-.070
Philips	PHIA	-.043
Royal Dutch Shell	RDSA	-.011
Unilever	UNA	-.138*
AEX index (25 stocks)	AEX	-.107

*significantly $\neq 0$ (5% level, 2-tailed test)

Finally, you run a regression in which, for each stock, the return today is explained by the returns from one to five days back:

$$r_t = \gamma_0 + \gamma_1 r_{t-1} + \gamma_2 r_{t-2} + \gamma_3 r_{t-3} + \gamma_4 r_{t-4} + \gamma_5 r_{t-5} + u_t$$

Table 2 shows the estimated coefficients, γ, of these regressions.

Table 2: Coefficients of time series regression, 5 lags

	γ_0	γ_1	γ_2	γ_3	γ_4	γ_5	
Ticker	constant	r_{t-1}	r_{t-2}	r_{t-3}	r_{t-4}	r_{t-5}	R^2
AF	-0.254	0.073	-0.121	-0.007	-0.083	-0.062	0.029
BOKA	0.291	-0.071	0.037	0.025	-0.126	-0.059	0.025
PHIA	-0.017	-0.032	-0.018	0.079	-0.058	-0.053	0.014
RDSA	-0.008	0.008	0.15*	-0.14*	0.054	0.079	0.046
UNA	0.036	-0.111	0.065	-0.090	0.042	-0.045	0.040
AEX	-0.029	-0.096	0.085	-0.027	0.039	-0.011	0.024

*significantly $\neq 0$ (5% level, 2-tailed test)

(d) Does Table 2 reveal market inefficiency? Explain why.

7. Stocks are expected to earn (much) more than the risk free interest rate. This means that stock prices are expected to increase over time which, in turn, means that stock prices will be positively autocorrelated and that they are not a fair game or a martingale as the EMH claims. Is this reasoning correct?

8. In almost all countries there are a few people who became very rich by speculating on the stock market. This proves that excess returns can be earned and that the stock market is not efficient. Is this reasoning correct?

9. You are a student with good data skills and you decide to apply your talents to the stock market. After running a large number of regressions you find that the sign (+ or -) of the change in a company's stock price in one quarter is an accurate predictor of wether the company's earnings in the next quarter will increase or decrease.

   (a) Does this finding contradict the EMH?

   Next, you take daily return data of 100 stocks and test 10 different filter rules on each of them. You find that 27 stock-rule combinations earn significantly higher returns than a buy-and-hold strategy.

   (b) Does this finding contradict the EMH?

   You take a closer look at the stocks for which you found profitable filter rules and you see that they mainly belong to smaller, infrequently traded companies.

   (c) Is this finding relevant for the application of filter rules?

   Finally, you decide to apply an automatic function generator. You let your computer search through a very large number of functions that relate stock prices to variables in your dataset. You find that next month's stock prices are accurately predicted by the streeet number in the company's address plus the square root of the number of visitors to the company's website.

   (d) Do these results contradict the efficient market hypothesis?

10. A local mutual fund says it has expertise in identifying stocks that are undervalued because they are underresearched or unpopular. To prove its point, the fund produces evidence that its return over the past four years was 3% above the return on the market index.

    (a) What does the EMH say about undervalued stocks?
    (b) Does the fund's evidence contradict the EMH?

11. Many (financial) newspapers around the world regularly publish a ranking of mutual funds in their countries, based on the funds' performance, together with a relevant index as a benchmark. What would be the place of the benchmark index in the ranking in an efficient marked? Distinguish between performance over short and long periods.

12. It is sometimes said that market efficiency protects unknowledgeable investors, so that it does not matter what and how you buy and sell, you always pay and get a fair price. Comment on this statement.

13. It is often reported that the price of a stock has increased over some period *before* the announcement of good news such as higher earnings, dividend increases, etc. Does this contradict the EMH?

14. There are cases in which the price of a stock *dropped* after the firm announced some good news, e.g. an increase in quarterly earnings. Does this contradict the EMH?

15. The following message is taken from the Newsweb on Oslo Stock Exchange.
On 2009-06-18, Det norske oljeselskap ASA announced that it had discovered between 40 million and 130 million barrels of oil in the Grevling prospect. The appraisal well shows that the discovery is larger than first anticipated. Prior to drilling operations, Det norske estimated that Grevling could hold between 10 million and 80 million barrels of oil. The appraisal well also shows that the discovery is larger than indicated by the first discovery well. Det norske increased its ownership stake in Grevling from five percent to 30 percent prior to drilling operations. The company's net share of the discovery is thus between 12 million and 40 million barrels of oil, which means that Det norske's share of the discovery could match the volumes it sold in Goliat for MNOK 1,100 last autumn.

    (a) Calculate the abnormal return of Det norske oljeselskap on the announcement day. Use the market model and an estimation window of April-May 2009. The datafile (DetnorData.xls) is on the website.

16. Szewczyk et al.[1] analyzed a sample of companies announcing dividend omissions (announcements that no dividends will be paid). The CAAR (in %) on days relative to the announcement day (zero) are in the table below.

Day:	-6	-4	-2	0	2	4	6
CAAR %	.108	.032	-.483	-5.012	-5.183	-4.563	-4.685

    (a) Do the results of Szewczyk et al. contradict the Efficient Market Hypothesis (EMH)? If so, explain which form of the EMH it contradicts. Make additional assumptions if necessary.

    (b) It is sometimes argued that management of firms announcing dividend omissions know beforehand what they are going to announce, so that they could have shorted (sold short) the stock a week before. This would give them, on average, 5% return in a week $\rightarrow$ >200% a year. This would be insider trading, but that happens, it is not illegal in some case and seldom discovered anyway. The conclusion is that the market is not strong form efficient. Is this argument correct?

[1] Samuel H. Szewczyk and George P. Tsetsekos and Zaher Z. Zantout, 'Do Dividend Omissions Signal Future Earnings or Past Earnings?', The Journal of Investing, Vol.6, n.1., pp-40-53, 1997.