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SHORT-TERM OVERREACTION IN THE FINNISH STOCK MARKET

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ABSTRACT

The purpose of the thesis is to find if there is evidence of the directional effect of a short-term overreaction hypothesis in the Finnish stock market. If the effect is found, it is assumed to disappear in a study window of five days as implication of the market efficiency.

Data consist of returns of stocks traded in the Large Cap and Mid Cap lists of Helsinki Stock Exchange OMX during years 2002 – 2007. The method is to separate the stocks, with daily return of a ±10 % or over to porfolios of winners and losers and study the price reactions in the first day and in the days 2, 3, 4 and 5 after the initial return of ±10 % or over.

The result of the study is, that there is a difference in the behavior of a prior winner portfolio in contrast to a prior loser portfolio: a prior losers become winners in the first day after the initial return and vice versa. This is similar with the overreaction hypothesis. The average return of a day 1 after the -10 % or more return is 1,2 %. The average return of a day 1 after the +10 % return is -0,5 %. The difference is 1,7 %. Approximately the same difference is found between the losers and winners if the data is smoothed by rejecting 10 pieces of the most extreme findings of both portfolios. During the days 2, 3 ,4 and 5 there cannot be seen a pattern like this in the returns of either loser of winner portfolios. That´s why there cannot be formed a trading strategy based on the results of the study.

KEYWORDS: Stock market overreaction, market efficiency, price reversals.

1.INTRODUCTION

The capital market is a title given to the market where long-term finance is raised by firms and by local and national governments. The new finance market is called the primary capital market, where the securities are sold for the first time and the secondary market, where securities are traded by market participants, financial intermediaries and individual investors. The attempt to control the fluctuation of the market and receiving benefit of it has been the interest of participants since the beginning of the activity.

"What goes up must come down
Spinning wheel, got to go around
Talking ´bout your troubles, it´s cryig sin
Ride a painted pony, let the spinning wheel spin!"
Spinning Wheel

David Clayton-Thomas (1969)

One may think that the scene described in the lyrics above could be a methaphora for the fluctuation in the stock market and implication to a contrarian investment strategy. Contrarian investment strategy emphasizes investing in stocks, that haven´t had a good level of performance in the past, in belief, that they are will perform better in the future.

Some laws of nature propose, as well, that there is eternal reversion going on in certain procedures: sun rises in the mornings and sets in the evenings. In the behavior of tide high and low alter in the shores from day to day, week to week, from now to eternity.

On the other hand, some confirmation for the opposite pattern, momemtum strategy, is presented in the First Law of dynamics (Galileo-Newton´s inertia principle) by Isaac Newton (1642 – 1727): "If a body is moving without external forces, then it maintains indefinitely its rectilinear and uniform motion with a constant speed, or, if it is initially at rest, it continues to be at rest." Momemtum strategy proposes investing in stocks, which have had good a prior performance and will thus continue to have a positive returns in the future.

Which one to chose? There are clear prerequisites for both momentum and contrarian actions in the stock market if paradigms of the profound theories, truths and cultural heritage of mankind are applied in the theory of finance.

When investigating the capital market and the macroeconomic issues, John Maynard Keynes, an famous economist, found in 1936 that there is too much fluctuation in the secondary market. Maurice Kendall, finance researcher, published "The Analysis of Economic Time Series" in 1953 where he discovered that the prices of stocks and commodities seemed to follow random walk. Random walk means that the price changes are independent of oneother and thus not predictable. Eugene Fama introduced the concept of efficient market in 1965. At the efficient stock markets the best estimation of the correct price of a stock is its market price. Even if there may exist some fluctuation at the market, effective market hypothesis states that

> *A perfectly efficient market is one in which every security´s price equals its investment value at all times.*

In an efficient capital market a security´s price will be a good estimate of its investments value meaning that the present value of its future prospects as estimated by well-informed and skilful analysts. Still there are types of fluctuation that exceed regular price movements: irregularities, also called anomalies. The best recognised anomalies are day of the week -effect, turn of the month -effect, January-effect and size -effect. Stock prices tend to underreact to news over short time horizons and continue to move in the same direction over some period of time , for example dividend announcements.

1.1 Background of the study

There are several anomalies in the stock market, which present direct challenges to the efficient market hypothesis. Some anomalous empirical evidence are, for instance, time -specific, such as the day of the week -effect, intra-day, intra-month and January -effects. Others are more company -specific: P/E -ratio, firm size -effect, and beta -effects are few examples. Most of the anomalies mentioned above can be traced back to the 1950´es and 1960´es and are still under thorough investigations by both academics and practioners, even if anomalies seem to dilute or disappear when discovered. Is there for example

a January -effect in the Finnish stock market nowadays? In a couple of last years, the answer is no.

The overreaction hypothesis states that investors are inclined to digest information irrationally and have a disposition of placing too much weight on more current events. In other words, investors ordinarily interpret new information, be it available or unavailable, in a systematically biased manner. They tend to be either over-optimistic or over-pessimistic, with no room in between. Under such a scenario, equity prices are not equitably determined by the "true" forces of the time, especially when new information or extreme events arrive. Although stock prices would go abnormally high (low) due to investors´ overreaction in the initial period, they have a tendency to adjust themselves back to the equilibrium level in the subsequent period. In essence, the stock price movement enjoys a systematic pattern and can be predicted beforehand under the assumption of the overreaction hypothesis. If that is the case, smart investors can exploit this opportunity of predictable reversal by implementing some sort of contrarian trading strategies for speculating or hedging.

The first empirical evidence supporting the overreaction hypothesis and document in the literature is by Rosenborg and Rudd (1982). DeBondt and Thaler (1985, 1987) provided the confirmation of a price reversal over a three-year return interval are, however, the most prominent and influential in stimulating the ongoing research. A true/false conclusion reached in the overreaction hypothesis is, nevertheless relevant to time frame of the return interval adopted, risk stationary, firm size and seasonality. Furthermore, many researchers have reached results about the overreaction hypothesis in both developed and emerging markets due totally to the factors examined in the study process. That´s why the usefulness of contrarian strategies, which are built upon the overreaction hypothesis has to be investigated.

1.2 The purpose of the thesis

The purpose of the study is to examine if there exists the directional effect of the short-term overreaction hypothesis in the Finnish stock marketthe market efficiency holds in case of short-term overreaction hypothesis and if the possible finding can implicate some patterns in stock returns. If a clear shaped pattern is found, the concern is, if one could form a trading strategy based on the pattern.

Study question of this thesis is: Is there a directional and/or intensity effect of the overreaction hypothesis in the Finnish stock market? Does the efficient market hypothesis hold in the Finnish stock market? Can there be trading strategy adapted of the behavior of prices in case of overreaction?

Hypotheses of this study are:

H1: There exists the price reversal as implication of directional effect of overreaction hypothesis in case of extreme price movements in the Finnish stock market.

H2: The overreaction exists, but it is corrected by market in subsuquent days as implication of market efficiency hypothesis

H3: There can be formed a reasonable trading patterns based on the behavior of stock: daily returns, special day or month.

The foundation of the first hypothesis is the assumption that historical data of the price returns of stocks can be used to predict returns. The subject is controversial among academics and practioners of financial market. Some think rather than the prices are independent and are based on the fundamental value of a company. Supporters of the idea claim that methods of technical analyses of stock market refer to the future. The hypothesis two believes in a market efficiency, but the hypothesis three proposes, that the market efficiency can be broken.

I propose that there exists the directional effect of a overreaction hypothesis in Finnish stock market, but that it is corrected in a near future and the efficient market hypothesis holds. The magnitude effect and the intensity effect, the two study questions of a Brown and Harlow(1988) are not analysed in this study:

nowadays there are only few initial reactions which have magnitude over 20 % or 30 % in stock returns and the intensity effect is should be analysed rather of intra-day data than of closing prices. Since the issue of the overreaction hypothesis has not yet been completely settled down in markets, this study tries to obtain a more clear picture by inspecting the extent to which investors have actually overreacted in setting prices in the OMHEX (Helsinki Stock Exchange) over the past decade.

1.3. Outline of the study

Thesis is organized as follows: the concept of market efficiency is discussed in the next chapter. Anomalies, irregular violations against the market efficiency are presented thereafter. There is also a quick view to the security pricing methods. The third chapter presents the behavioral finance, the relevance to the subject comes from the inexlicable fluctuations of prices in the stock market. The overreaction literature is presented in chapter four where there is also the Helsinki Stock Exchange presented. Fifth chapter is the empirical part of the thesis, which outlines methodology and empirical findings of the study. Conclusions are expressed in the chapter six.

2. MARKET EFFICIENCY

The concept of efficient market was discovered by chance as a by-product. Statistician Maurice Kendall (1953) had been studying the behavior of stock and commodity prices and looking for regular price cycles, but could not find them. Instead he discovered that prices seemed to follow "random walk", where one day´s price change could not be predicted by looking at the previous day´s price change. The random walk -theory states that stock and commodity price movements will not follow any patterns or trends and that past price movements cannot be used to predict future price movements. There is no systematic correlation between one movement and the subsuquent ones (Brealey and Myers 1996). A reason for random walk is that the share price reflects all available information at any one time and it will only change if new information arises. Successive price changes will be independent and prices follow random walk because the next information or news will be independent of the last piece of news. There is no quarantee whether the news will be good or bad (Arnold 1998). Term random walk can be misleading if it is thought that the price of a share moves at random, without any reason. If so, market would be inefficient because share prices would change without any good reason (Jones and Lumby 1999).

The concept of efficient market was developed in 1965 by finance researcher Eugene Fama. It states that

"An efficient market is defined as a market where there are large numbers of rational, profit-maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value."

These highly controversial and disputed theories are foundation how the stock market fluctuations are studied nowadays and especielly the theory of efficient market has been met with a lot of critics by both researchers and practioners. Above all, technical analysts have had opponent view for the issue. Their argument against the efficient market theory is that many investors base their expectations on past prices, past earnings, track records and other indicators. Because the stock prices are largely based on investor expectations, many of them think that it only makes sense to believe that past prices influence on future prices. Supporters of the efficient market hypothesis believe that it is useless to search for undervalued stocks or try to predict forthcoming trends in the stock market through technical of fundamental analysis.

The efficient market hypothesis doesn´t imply perfect forecasting ability. It is thought that if orices go up and down, and it´s a sign of a violations against the representativiness of the theory. But, the violation would be, if the prices wouldn´t act that way. As well, it is error to think that the random behavior of stock prices implies that the stock market is irrational as a whole. Irrationality and randomness are not synonymes, rather vice versa: stock prices are random because investors are rational and competive (Brealey and Myers 1988).

Knüpfer and Puttonen (2004) defend the efficient market hypothesis as most misunderstood theory of finance. They claim that prices of stocks can differ remarkably from their intrinsic value, effectivity assumes only that the differation is corrected eventually. Half of the investors win the market and half of the investors lose to market, but this is random. All operators are not rational, but that does not mean, that the market as a whole would not be that. Even if there exists anomalies, irregularities in stock markets, efficent market is a self-correcting mechanism, where there may occur inefficiencies, but they are corrected after investors discover them and exploit them.

Arnold (1998) concludes the importance of the market efficiency for three reasons. It encourages individual investors to invest in private enterprise. If there is no correct pricing, many savers will refuse to invest because of a fear that when they sell, the price would not represent the fundamental value of attractions of the firm. It gives correct signals to company managers in implementing the shareholder wealth-enhancing decisions. It helps allocate resources by both operating and pricing efficiency. If stock market is not pricing

the share of a poorly run company in a declining industry correctly, the company will be able to issue new shares and thus attract society´s savings instead of better options.

Critics agains efficient market hypothesis has been stated by practionaires: any portfolio will perform as well or better as a special trading strategy when there is a rising prices and there should be fewer fluctuations if the markets are efficient. Traders are mostly passive and only a minority of investors have a information enough for the active trading. The defence of efficient market hypothesis for these comments are, that systematic risk is greater for a "any portfolio", prices fluctuate because of the new information announcement by companies and information of active, sophisticated traders spreads fast in public by their buying and selling actions forming a semi-strong form of efficiency (Arnold 1998).

Fama (1998) defended the idea against critics. He stated that the standard scientific rule orders that the concept of market efficiency can only be replaced by a better. The alternative has a daunting task: it must specify what it is about investor psychology that causes simultaneous underreaction to some types of events and overreaction to others. And the alternative must present well-defined hypotheses, themselves potentially rejectable by empirical tests.

2.1 Perfect capital markets

To contrast to the efficient markets, the perfect market has some special definitions. Stock markets are perfect if the following conditions are fulfilled (Copeland and Weston 1988):

- Markets are frictionless. That is there are no transaction costs or taxes, all assets are perfectly divisible and marketable, and there are no constraining regulations.

- There is perfect competition in product and securities markets. In products market this means that all producers supply goods and services at minimum average cost and in securities markets it means that all participants are price takers.

- Markets are informationally efficient: i.e. information is costless and it is received simultaneously by all individuals.

- All individuals are rational expected utility maximizers.

Given these conditions both product and securities markets will be operationally, allocationally and informationally efficient. Assumption for the operational efficiency is that intermediaries, who provide service of channeling funds from savers to investors do so at the minimum cost that provides them a fair return for their services. In allocationally effective market prices are determined in a way that equates risk-adjusted marginal rates of return for all producers and savers and there the process of allocating societies scarce resources between competin real investements is effective. Efficiency in information means that it is not only received simultaneously by all counterparts but also received in a symmectric form. Informational efficiency is prerequisite for allocational efficiency and thus cornerstone of the theory.

Sharpe (1985) states that opposite of perfect capital markets is crazy capital market. New information is a surprise, because if it is not, it is predicted by the market. Since happy surprises are about as likely as unahappy, prices behave similarly in an efficient market. While security´s price is unpredictable in such a market, in perfectly efficient market price changes would be more or less random. Market may not be perfectly efficient, but closer to that than craziness. Well organized market places, like New York Stock Exchange in the USA is considered to constitute a efficient market in a practical level (Ross et al 1995).

2.2 Three forms of efficiency

According to Fama (1970), there are three forms of market efficiency:

1) Weak-form efficiency means that the unanticipated return is not correlated with the previous unanticipated returns i.e. the market has no memory and the current prices reflect all information contained in the past prices.
2) Semi-strong market efficiency means that the unanticipated return is not correlated with any publicly available information i.e. prices reflect not only past but all other published information. Finally,

3) Strong-form efficiency means that unanticipated return is not correlated with any information i.e. price reflect all existing information, be it publicly available or insider. This would mean, that prices would always be fair and no investor would be able to consistently superior forecasts of stock prices (Brealey & Myers 1988).

FORM OF EFFICIENCY	INFORMATION REFLECTED IN PRICES
Weak	Previous prices of security
Semi-strong	Publicly available information
Strong	All information, both public and private

Table 1. The forms of efficiency (Alexander &Sharpe 1989)

The efficiency of the markets has been tested in several empircal tests. These tests have found efficiencies of different levels in stock exchanges of the world.

2.3. Testing the market efficiency

The joint-hypothesis problem causes that market efficiency isn´t testable intrisically. It must be tested jointly with a model for expected, normal returns. This means that a model of equilibrium, an asset-pricing model, must be used jointly to test whether information is properly reflected in prices. If irregularities on the behavior of returns are found, it is difficult to classify whether the reason for this is market inefficiency or a bad model equilibrium (Fama 1991). The bad model problem is less serious in short return windows event studies, studies which last for few days, and where daily expected returns are close to zero and more serious in long-term buy-and-hold abnormal returns, which compound an expected-return model´s problems in explaining short-term returns (Fama 1998).

The identification of inefficiencies in the stock market may provide opportunity for financial gains and thus the counterparts of market test the inefficiency constantly at empirical level. When inefficiency is found, it is possible that it can be exploited for a while to get profit at the market. The tests of weak form efficiency have found that market is efficient in the weak sense, but the evidence on semi-strong form efficiency is more mixed. Testing procedure,

joint-hypothesis problem causes difficulties in finding the proof on the case. Still the majority of the studies conclude that most stock markets fulfill the requirements of weak and semi-strong efficiency at least most of the time. In the strong form efficiency the market would reflects all the information, published and unpublished in the prices of stocks the information and there is some evidence on the strong form of efficiency as well (Jones and Lumby 1999).

2.3.1. Tests for weak-form efficiency

The weak-form tests of efficient market hypothesis are implemented with the forecasts of historical stock price data of past returns. The results of the predictability of short-term returns are mixed. In the 1960´es and early 1970´es the continuous expected returns hypothesis was normally accepted and even there were some evidence that returns were predictable the tests had no statistical evidence (Fama 1991). Lo and MacKinlay (1988) and Conrad and Kaul (1988) were able to show that, due to variance reduction obtained through diversification, portfolios produce stronger indications of time variation in weekly expected returns than individual stocks. However, this is at least partly due to non-syncronous trading effects, especially for small stocks. French and Roll (1986) found out that stock prices are more variable when the market is open, is is that variance is higher during trading hours than during non-trading hours. A explanation for this is the transitory component in price changes that induced by the noise trading of uninformed investors. More recent studies were able to show that daily and weekly returns are predictable from past returns and the constant expected returns hypothesis was rejected.

In studies of the long-term return predictability, the literature doesn´t interpret the autocorrelation in daily and weekly returns as important evidence against the joint hypothesis of market efficiency and constant expected returns. The support for that is, even when the autocorrelation deviate reliably from zero they are close to zero and thus economically insignificant. For contradiction, Summers (1986) presented models in which stock prices act according to large slowly decaying movements away from the fundamental values. These models tell that the market is highly inefficient, but so that it is missed in tests on short-term returns. The evidence is clear, but the tests showed only weak statistical significance. Fama and French (1988) found that the autocorrelations of returns on diversified portfolios of NYSE stocks had the pattern predicted by Summers,

but the tests on long-term returns got from small sample sizes and low power. So, there is merely a weak statistical evidence against the hypothesis that returns have no autocorrelation and prices act as random walk, similar findings there was in the study of Poterba and Summers (1988).

Return predictability also includes the work on forecasting with variables like for example dividend yields and earnings/price ratios. There exists many anomalies like earnings- and size-related regularities and stock market seasonalities.

2.3.2. Tests for semi-strong trong form efficiency

Tests for semi-strong form of efficiency focuses on the question of usefulness of acquiring and analysing publicly available information. Semi-strong efficiency interests the researchers and practioners most of the forms efficient market hypothesis. If market is efficient in a semi-strong way, it undermines the work of fundamental analysts whose trading rules can not be applied to produce abnormal returs because all publicly available information is already reflected in the stock price (Arnold 1998). Studies of the semi-strong form of the efficient market hypothesis can be categorized as tests of the speed of adjustment of prices to new information. The principal research tool in this area is the event study. Using simple tools, this research documents interesting regularities in the response of stock prices to investment decisions, financing decisions and changes in corporate control. Usually daily data is used in event studies, because it offers advantages compared to longer-interval data. When the announcement of an event can be dated to a particular day, daily data allows precise measurements of the speed of the stock-price response – the central issue for market efficiency. Another powerful advantage of using daily data is that the joint-hypothesis problem can be eliminated (Fama 1991).

The typical result in event studies on daily data is that, on average, stock prices seem to adjust within a day to event announcements. Therefore, it can be said that the adjustment of stock prices to new information is efficient. On the other hand, since event studies focus on the average adjustment of prices to information, they do not tell how much of the residual variance, generated by the deviations from average, is rational. So, the efficiency issues are never entirely solved. Some event studies suggest that stock prices do not respond

quickly to specific information. However, the main point is that event studies are the cleanest evidence on efficiency and with few exceptions, the evidence is supportive (Fama 1991)

2.3.3 Tests for strong-form efficiency

There are likely some positive information and trading costs, so the extreme version of the market efficiency hypothesis is false. It assumes that there are no costs of information or cost of trading at the market (Grossman and Stiglitz (1980). A weaker assumptions for the hypothesis there are in Jensen´s (1978) study which found out that prices reflect information to the point where the marginal benefits of acting on information doesn´t overrate the marginal costs. If an efficient market is defined so that there are no risk-free returns above the opportunity cost available to agents given transaction costs and agents´ information, there is no contradiction between efficient market hypothesis and cointegration (Dwyer and Wallace 1992). Despite being economically more sensible, this approach suffers from the difficulty of deciding what are reasonable information and trading costs. Ambiguity about information and trading costs are not, however, the main obstacles to inferences about market efficiency. Early identification of new information can provide substantial profits. Insiders who trade on the basis of priviledged information can therefore make excess returns, violation the strong form of the efficient market hypothesis. For insiders the stock market is not efficient, they have information that is not reflected in prices.

The evidence shows, that because information has costs, some informed investors, like professionals of financial analysing, benefit for the costs they use in their effort to ensure that prices adjust to information. The market is then less than fully efficient, there can be private information not fully reflected in prices, but in a way that is consistent with rational behavior by all investors (Fama 1991). This is in line with the noisy rational expectations model of competitive equilibrium must leave some profit for professional analysts. After all, the concept of market efficiency has to adapt the possibility of inefficiencies in a small scale. Stock market cannot be efficient in the completely strong form. Still, wide exploitation of a private information is rare, even if some critics is

presented agains the actions of professional mutual-fund managers and security analysts, and advisors of the financial intermediaries.

2.4. Analysing the stock market

Majority of the active stock market investors try to beat the market. They attempt to identify under-valued shares and buy them before their price rises: similarly, they look for over-valued shares in order to sell them before their prices fall. In other words, such investors are backing their own judgement about what the shares are worth, against the collective judgement of the stock market as seen in the current price of the shares. Therefore they act as though the market were inefficient.

There are basically three or four forms of stock market analysis that investors use to help them try and identify over- and under-valued sare and these are linked to the levels of efficiency we have discussed. Traditional stock market analysis methods that are used to valuate prices of securities, analyses that investors use to identify over- and undervalued shares. They are fundamental analysis and technical analysis. Fundamental analysis investigates the reasons and technical analysis the effects of changes in stock valuation. Two discussed metods of stock market analysis are the use of insider information and analysis of investor sentiment as a concept of behavioral finance (Shefrin 2000).

Supporters of fundamental analysis claim, that technical analysis is against efficient market hypothesis: if relevant information is used in pricing the securities, they follow random walk and historical data doesn´t help to see to the future. Another often argued fact about technical analysis is that it is a method, which fulfills its own predictions. When practioners of stock market use tools of technical analysis similarly and get the same signals, buy or sell, the prices behave accordingly. The similar interpretation of market information, however, doesn´t occur either in technical analysis or fundamental analysis. Fundamental analyses may differ from eachothers (Luoma 1990).

The ratio between supply and demand makes the price of goods in the market. The “right price” of a security is formed in stock exchanges by market counterparts who establish the supply and demand for securities.

2.4.1 Fundamental analysis

Fundamental analysts study the fundamental factors that lie behind a stock or commodity value. These are company´s sales, earnings, growht potential, assets, debt, management, products and competition. Competition in fundamental research will tend to ensure that prices reflect all relevant information and that price changes are unpredictable. The other analysts study the past price record of stocks and look for cycles. These analysts are called technical analysts. Competition in technical research will tend to ensure that current prices reflect all information in the past sequence of prices and that future price changes cannot be predicted from past prices (Brealey and Myers 1996). Investors are flooded with variety of information on macroeconomic indexes, policymakers´ statements and political news. Future growth rate, inflation rate and interest rate affect on investor´s expectations of stock market prices (Veronesi 2000).

Even if accounting policies have changed to more open and reliable there remains a question about the possible manipulation of companies announcements, for example balance sheets or income statements. A stock´s historical price data is absolute and can not be manipulated. This gives more weight on technical analysis (Carlson 2007).

Traditional asset-pricing models were invented in 1960´es and 1970´es to predict asset returns. The most important of the models is Capital asset pricing model CAPM. It is theory, which has dominated the academic literature ever since and influenced greatly the practical world of finance and business for over four decades. It was developed by William Sharpe and John Lintner in mid 1960´es. CAPM is essentially reduction of the Portfolio theory by Harry Markowitz from 1952. Other famous asset-pricing models are APT, arbitrage pricing theory by Stephen Ross and Robert Merton´s intertemporal capital asset pricing model ICAPM (Martikainen 1998).

A central objective of CAPM is used as a model for the pricing of risky assets. It describes the relationship between risk and expected return. The CAPM model provides a means with which the future cash flows of an asset can be discounted. The riskier the asset, the lower the present value of its future cash flows.

A central principle of the CAPM is that systematic risk which is measured by beta, is the only factor influencing on the level of return required on a share for a fully diversified investor. For practical use this risk factor is considered to be the extent to which a particular share´s returns move when the stock market as a whole moves. What is more, the relationship between this beta factor and returns is described by a straight line, if is linear. This compact and complete model changed the way people see the financial market and affected their actions.

According to CAPM there are different expected rates of returns for various investments only because their beta coefficient is different. Instead of a matrix of covariances between all securities in the market, there is only one covariance coefficient: beta, the covariance between a security and the market. Several models are presented for security pricing. For example, Arbitrage pricing theory, APT, which divides the beta-coefficient of the CAPM-model for set of components is more difficult to exploit in practice. (Martikainen 1998)

The CAPM formula by Sharpe is:

$$E(r_i) = r_f + \beta_i(E(r_m) - r_f \quad (1)$$

Where:

$E(r_i)$ is the expected return on asset I

β_i is the Beta of asset i

$E(r_m)$ is the expected market rate of return and

r_f is the risk-free rate of interest

A security's Beta measures the amount of movement expected in the security's price for a given movement in the market in general. For instance, if a security has a Beta of 1.2, it is expect to move up 1.2% for every 1% upward move in the market; and move down 1.2% for every 1% downward move in the market (Ross et al. 1995).

Hong and Stein (1999) state that it is becoming increasingly clear that traditional asset-pricing models as capital pricing model (CAPM) of Sharpe and arbitrage

pricing theory (APT) of Lintner and Ross or Merton´s intertemporal capital asset pricing model (ICAPM) are becoming less accurate in explaining the growing set of facts affecting on the capital market. Fama´s more recent (1998) point of view is that an efficient market is not an old-fashioned hypothesis. He states that in an efficient market, apparent under reaction will be about as frequent as overreaction to information: if anomalies split randomly between these two cases, market efficiency holds. Fama also states that the long-term return anomalies are sensitive to methodology and they tend to become marginal or disappear when exposed to different models for expected (normal) returns or when different statistical approaches are used to measure them.

Another basic model to value the price of a stock is Gordon´s model:

(2) $$P_0 = \frac{D_1}{R\text{-}G}$$

where D1 is the (assumed) dividend company is paying next year
R is the required return
G is the growht of dividends (G < R)

Assumptions for using the Gordon´s model is that the first dividend paying occurs one year from now and they occur year after year steadily at the same time (Vaihekoski 2002). Dividend should be solid or it should grow in a known manner.

2.4.2 Technical Analysis

Technical analysis is a method where statistical and graphical market information are used for the purpose of forecasting future prices. In a narrow sense technical analysis means analysing price and volume of change in a stock market. In a broader sense technical analysis considers analysis of stock and commodity market structure and above all its reactions to market information. Fundamental and technical analysis are to complete eachothers: fundamental

analysis helps investor by pointing out the competent securities and technical analysis helps in right timing of buying selected securities (Luoma 1990).

A technical analyst is not interested in estimating the intrinsic value of stock and doesn´t use fundamental information, such as the profit figures or macroeconomic conditions to analyse stock prices. Instead he believes that a chart of price and data of trading volume is all that is needed to forecast future price movements (Arnold 1998). Theory of random walk challenges the technical analysts to think, if share price follow random walk, technical analysis is worthless because it cannot have any predictive power: anything which moves at random cannot be predicted (Jones and Lumby 1999). Technical analysis is a controversial method in finance. Some professionals think that technical analysis can provide valuable information change in stock market valuation and some think it is useless for that purpose. However, technical analysts make stock market more efficient by securing prices (Martikainen 1998).

In predicting prices, psychological support and resistance ranges are important to realize. Support range means area of congestion or previous lows below the current price mark support levels. Resistance range means area of congestion and previous highs above the current price mark the resistance levels. Support range occurs, when there a so many buyers in the market, that bear market stops. Resistance range occurs, when there are so many sellers in the market, that bull market stops. Support and resistance ranges are to stop upward and dowhward slopes of stockmarket. These ranges are posted by psychological factors of investors´ and when ranges are broken, it takes time before new ranges are posted in new positions: there are no solid points of contagion in new price range (Kallunki et al 2002).

Charles Dow developed in the beginning of the 20th century theory of trends in stock market. In Dow-theory stock prices move in three different trends. The first and most important is a primary trend which refers to the long-term move in share prices. The secondary of the intermediate trend runs for weeks or months before being reversed by another intermediate trend in the other direction. Tertiary trends, which last for a few days, are less important. Supporters of Dow-theory tried to recognise the main trend in the stock market from the usual market fluctuation by investors. The swing in a primary trend

shows the time to buy or sell stocks. The swing can be seen by change in secondary trend (Martikainen 1998).

Stock market volume and price changes are the basis for the technical analysts, who believe they can find trends which repeat in patterns. There is a variety of techniques used in technical analysis which concentrate on different components of historical data of stock market pricing. Kallunki et al (2002) present a few of these even if new techniques are developed all the time:

a) A japanese candlesticks charting was developed in 17th century in Japan for trading analysis of rice. It is easy technique to interpret and a flexible and clear method of technical analysis, where especielly the relationship between opening and closing, high and low prices are shown in the chart. A japanese candlestick charting techniques can be used independently of other technical tools.

b) Point & figure – method was invented in 20th century in USA. In the typical use of the method stock closing price or high and low price movements are plotted in the price chart where the potential changes are studied. Point & figure –method closes the noise behavior of market and concentrates on the main direction of price trend. The method is usually more suitable for long-term analysing, but can be adapted to the short-term analyses.

c) Relative strength index –method was developed in 1978 by J.Welles Wilder in USA. It compares the magnitude of recent gains/recent losses in order to show overtraded conditions of and asset:

$$RSI = 100 - \frac{100}{1+RS} \quad (3)$$

where RS = average up closing of day X / average down closing of day X

d) Moving average-method is a tool to evaluate time-series data of stock prices. In moving avere method stock prices are calculated in to the sum of digits and in effort to limit the effect of rapid movements in longer term short-term movements.

e) On balance volume, the OBV-method is used to find the momentum when to buy or sell the stock. It shows where a stock is traded by large number of buyers and sellers and thus predicts the upward or downward swing in the stock price.

Technical analysts don´t know and don´t even specially want to know why a particular share´s price is predicted to rise or fall. All they know is that that is the movement implied by the following pattern. However, it has to be said that if chartism is to work, it imples that there are patterns in the behaviour of investors since it is very difficult to see how there might be pattern in the real-world events driving the value of an individual company (Jones and Lumby 1999).

2.4.3 Noise

A large amount of transactions in securities market is derived from so called noise traders. Their behavior can not be predicted by fundamental or technical analysis of financial market. Noise traders are market counterparts who sell and buy stocks from the basis of irrelevant information. These speculative investors don´t have and are not interested in fundamental information to support their investment decisions and they trade irrationally. Neither they have inside information. Even if the nature of the activity is irrational, noise traders represent an important aspect of the functioning of the securities market: they reduce the risk of market crashes and facilitates transactions among agents (Black 1986). There exists rational noiser trading: they trade for example liquidity or tax purposes. There has to be these two kinds of trading in the well functioning financial markets: trading on information and trading on noise:

1) noise makes trading in financial markets possible and because of the noise it is possible to observe prices and
2) noise trading is essential to existence of liquid markets. This means that noise causes market to be somewhat inefficient but often also prevents taking advantage of inefficiencies.

So called arbitrageurs can help in developing market to more efficient direction, but the noise traders behaving irrationally can do just the opposite. Noise

traders are useful to arbitrageurs in taking risk: arbitrageurs need a premium for their acitivity. The poorer performance of a noise trader is not a rule, because they may earn higher returns than arbitrageurs when investing in a riskier assets (Linnainmaa 2003).

2.5 Anomalies

The term anomaly describes the situation, when the central paradigm of any science is violated by discovery, which governs over the normal expectations of the specific science (Kuhn 1962) In the efficient financial market the return of a stock should be determined by risk free interest rate and systematic risk, beta coefficient. There are several anomalies found and reported from different markets of the world, reliable, widely known and inexplicable patterns in returns. When anomaly is discovered, it should disappear by actions of markets. Still, empirical studies have shown the irregularities in the returns of stocks continue to act in anomalous way which can not be explained by systematic risk. The existence of irregularities, also called anomalies, challenges the efficient market hypothesis (Malkamäki 1990.)

Widely diagnosed anomalies in finance are firm-specific, calendar and technical irregularities in stock market return patterns. Company-specific, cross-sectional return anomalies are for example the size effect, the earnings/price effect, price/book effect and calendar, time series return anomalies are turn of the year, beginning of the week and turn of the moth (Hawawini and Keim 1995).

There is strong support that anomalies exists in even the most liquid and densely populated financial markets. Whether they can be exploited to earn returns in the future remains open to question. If anomalies do persist, transactions and hidden costs may prevent them being used to produce outperformance, as well as the rush of other investors trying to exploit the same anomalies. It may be possible that opportunities arise in quanta bursts and then disappear rather like the track in a cloud chamber. If so, by the time we wish to measure the recurrence of an event, it has occurred and passed by, unlikely to be repeated in the same form (Hawawini and Keim 1995).

2.5.1 Company-specific anomalies

The size effect was first studied by Benz (1981) who found the causality between size and returns from. The size effect means that the stocks of a small capital companies gain higher returns than the mid or large capital companies. For example in a study from USA the companies having the market value among smallest 20 % of the companies gain 20 % higher return than the companies having the market value among the the biggest 20 % of a market. (Francies 1986). The size effect is combined in studies with the January-effect. It occurs mostly during the two first weeks of January, in some extent in February and March, but not significantly in the rest of the year (Brealey and Myers 1996). This may be because of the taxation: many investors sell the stocks, that have performed poorly before the end of the taxation period in order to reduce taxes. When they allocate the funds again in the beginning of the year, then demand may rise the stock prices. (Bodie et al 1998).

The earnings/price -anomaly states that the stocks with low price to earnings, P/E -ratio have better returns than the market average and stocks with high P/E -ratio. It was found by Basu (1977). He studied the numbers between P/E and returns of companies of New York Stock Exchange and the result was that there are higher returns in stocks with low than high P/E. Later on some strong evidence for the anomaly has been found among others in studies from the USA, United Kingdom and Japan.

2.5.2 Time-specific anomalies

The January-effect is the best known time-specific anomaly. It refers to the fact that stocks have abnormally high returns in January. January-effect is mixed to the size-effect: particularly stocks of a small capital companies have performed in a excellent way in the beginning of the year, but as well large capital companies have had good return in comparison to the rest of the year. Also the stocks, that have performed poorly in the end of the year have abnormally high returns in January. The monthly stock returns were examined from 17 countries during January 1959 and December 1979 and found that all countries in the sample exhibited a large and positive mean return: in January the returns

were larger than in other months in 13 of the 17 countries analyzed. (Gultekin and Gultekin 1983)

Turn of the month -effect stands that stocks show higher returns on the last day and first four days of the month. Turn of the month effect may be resulted by cash flows at the end of the month, salaries, interest payments etc. Martikainen et al (1994) investigated the phenomenon in 24 countries and in 12 regions of the world. They were motivated because the major of explanations offered for the (ir)regularity were based on the institutional factors and the wide data made it possible to reduce the risk of potential data snooping bias. They found the turn of the month –effect in several countries as well as for most regions studied. The strongest evidence was from U.S. markets: the returns of -1 day were higher than the returns of other turn of the month days. In Finnish market, stock index futures, options and cash market the turn of the month –effect was found as well. Strong effect was found in the last trading week of the month. The effect seemed not to be sensitive to other seasonalities like turn of the year or day of the week. The behavior of mutual funds or expiration of stock index derivatives could not explain the effects (Martikainen et al 1995). If an investor acquires stocks regularly to her portfolio, it could be profitable to time the purchases to fit in to this pattern. Still, it is difficult if not impossible, because of trading costs and other market frictions. Investors should however, keep in mind that the difference is small and virtually impossible to take advantage of because of trading costs.

Basis for the day of the week –anomaly is the fact that Monday is found to be the worst day to invest in stocks. The volatility and market sentiment developes during the week at the market. Martikainen and Puttonen (1996) concluded that thin trading and short selling restrictions may lead to price delay and negativer returns in Tuesday. Restrictions varied in different financial market and caused different results in empirical studies. The problem was somehow diminished til the Nikkinen and Sahlström (2003) studied the impact of macroeconomical news on the Finnish market and found that the best returns were achieved on Tuesdays, Wednesdays and Fridays. It will be difficult to base a trading strategy for assumptions of the day of the week –effect, because the differences are small and there are positive costs for trading activity. The behavior of traders of different size was the interest of Kallunki and

Martikainen (1996). They discovered that while, small traders increase their sell orders in the beginning of the week, the large traders rather buy at that time.

2.5.3 Other anomalies

The post earnings announcement drift -anomaly was found by Ball and Brown (1968). The anomaly is based on the fact that the stock price reacts to announcements of a company and it is shown that there is tendency in the market to react a prior the announcement. They showed that the announcement started to effect on the stock price already 12 months before the accrual announcement time. After the initial announcement the price changes tend to persist: stocks with positive surprises tend to continued to have better returns and those with negative surprises tend to continue to downward.

When the company sets an initial price offering, IPO, of it´s shares to financial market, it is advantage for them and for the organizing investment bank that market buys the shares released. There is however evidence that initial price offers in aggregate doesn´t perform to it´s right extent and the same is underperforming is discovered with secondary offerings as well. In US market the average return in the first day of shares bought from IPO was 18.8 percent. In the longer period of three years, the IPO shares underperformed the value-weighted market index by 23.4 percent (Ritter and Welch 2002).

3. BEHAVIORAL FINANCE

Behavioral finance can be defined as the theory where psychological and behavioral measures are integrated in classical finance theories in order to understand the performance of the markets. Study of psychology and other social sciences can be used to explain irregularities of financial markets. Human social and scientific research is on human and social cognitive and emotional biases to better understand the decision making (Shefrin 2000).

The cornestone in the theory of modern finance is an efficient market hypothesis. It assumes that participants in the market are rational profit-maximizers who actively effort to predict future market values of securities actively. All participants receive all the relevant information symmetrically and simultaneously and exploit it in a systematic and reasonable way. Thus the price of the security is correct all the time. Behavioral finance and traditional finance differs in a way that behavioral finance begins by relaxing assumption of investor rationality. Behavioral finance is concerned with questions on how investors err in their decisions and on how their assumed irrationality affects asset prices. It also documents differences and biases among investors, without always explicitly arguing that errors induce mispricing. Behavioral finance recognises the basis of the standard, traditional theory of finance, but inquires to complete it with own paradigms.

The researchers and supporters of behavioral finance were challenged by Fama (1998) by claiming that following the standard scientific rule, theory of the market efficiency can only be replaced by a better theory. The alternative theory has a daunting task. It must specify what it is about investor psychology that causes simultaneous underreaction to some types of events and overreaction to others. Furthermore, the alternative must present well-defined hypotheses to hypothesis of the efficient market, themselves potentially rejectable by empirical tests.

The new paradigm of behavioral finance seeks to replace the behaviorally incomplete theory of finance now often referred to as standard or modern finance. Even as it seeks to be a replacement for the existing financial paradigm,

however, behavioral finance recognises that the existing paradigm can be true within specific boundaries.

3.1 The concepts of behavioral finance

During the 1960es cognitive psychologists started to study decision making processes under uncertainty. There had been a connection between psychology and economic discussion, which had vanished, but advances made by psychologists came to attention of economists (Shefrin 2000). One of the first academics studying this field was Simon (1955) aimed to construct definitions of "rational choice" that would be modeled more closely upon the actual decision processess in the behavior of organisations. Moreover, he wanted to model the individual behavior and decision making in organizational context. He assumed the behavior to be at least intendedly rational. In modeling there was approached presented where the lack of computing power turned out to be obvious.

Slovic (1972) saw the relevance of behavioral concepts for finance and emphasized mispections about the risk. Tversky and Kahneman (1974) studied decision making judgments under uncertainty. They found three heuristic-driven errors in people´s behavior: representativeness, availability of instances or scenarios and adjustment from an anchor. These heuristics are usually effective, but they lead a systematic and predicable errors.

The two profounding theories of behavioral economics are the prospect theory by Kahneman and Tversky and a theory of mental accounting by Thaler (1980). In their work on prospect theory, Kahneman and Tversky (1979) provided a descriptive framework for the way people make choices under risk and uncertainty. The critique of their work was opposed against utility theory as a dominating model for decision making under risk.

In prospect theory a value function represents utility over gains and losses, not levels of wealth as in utility theory. Gains and losses are measured with respect to a reference point, which is usually dependent of decision maker´s valuations. Small probabilities are overweighted and large ones are underweighted. S-shaped value function is concave for gains and convex for losses and steeper for losses than for gains. This means that when the function is steeper for losses they hurt more than gains of the same size would please (Kaustia 2003). Utility

functon is more complex than conventional microeconomics models. It posits that utility depends on deviations from changing average points rather than on absolute levels of wealth or consumption (Scott et al 1999).

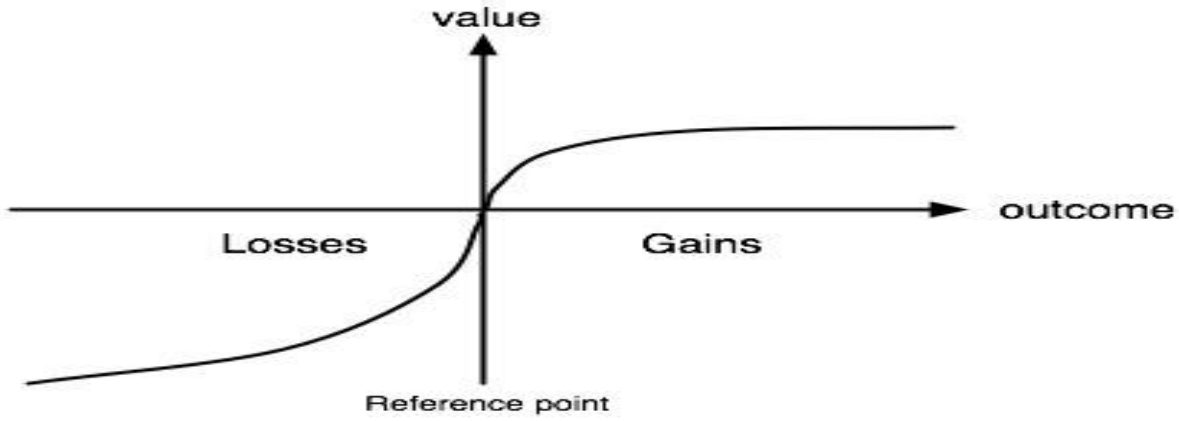

Figure 1. The prospect theory function

Financial decision makers tend to prefer avoiding losses instead of acquiring gains as the prospect theory states. This property of investors´ is called a loss aversion: they are twice as more distressed by losses than they are pleased by gains of same sum. People tend to gamble in losses and hold losing position too long and in hope of possible recovery of prices: the fact that is shown by studies where people keep getting losses of bad investments, but sell good investments too soon. They tend to think, that there will be some kind of reverse in a stock market as a nature of law, even if that kind of patterns in stock returns doesn´t exist in the assumed efficient stock market. However, whereas the expected utility investor is approximately risk neutral over small gambles, the prospect theory investor is loss averse also over small gambles (Scott et al 1999).

Many experimental studies have found evidence consistent with loss aversion and other predictions of prospect theory. In a study using actual market data it is found evidence of increased risk-taking in the domain of losses. Professional future traders, who experience losses in the morning, are more likely to take risks in the afternoon. This is consistent with loss aversion and motivation to break even (Kaustia 2003).

The prospect theory is favorable for momentum investing strategy rather than contrarian strategy: if an investors behaves like he would have utility functions for losses and gains for every single series of stocks individually, it would cause unnecessary trading activity for portfolio. Rising stocks are to be sold too

quickly and depressing prices relative to fundamentals. Risk seeking in losses will effect on holding investments too long against declining prices (Scott et al 1999)

Mental accounting means that people make decisions by dividing the financial decisions into groups of mental blocks. They name, categorise and evaluate economic outcomes into a different mental accounts. The theory was developed by Thaler (1980) but Kahneman and Tversky (1984) who were the first ones to use the exact term mental accounting in a sense that decision makers tend to separate financial matters into different classes in their justification. This causes the contradiction between the optimal solutions and actual decisions made.

An example of mental accounting in the stock market is that people use rather dividends for consumption than more valuable stock holdings. Reason for this is that investors want to have separate accounts for consumption and investment and are reluctant to mix these two (Shefrin and Statman 1984).

The tendency of selling winners too soon and holding losers too long is labeled the disposition effect by Shefrin and Statman (1985). Disposition effect means the selling dilemma in its original version. They identify several factors that can contribute to such behavior. The first is prospect theory: an investor with preferences given by prospect theory would become more risk-averse after experiencing gains, and risk-seeking after experiencing losses. This means that holding on to the investment becomes more attractive that selling if the value of the investment goes down, because the investor is willing to tolerate more risk. So the attractiviness of a stock´s risk-return profile is determined not only by issues pertaining to the stock, but also by the movements in the stock price that have occurred while the investor has been holding the stock. Whether this affects decisions on each stock that the investor is holding, or decisions concerning the investor´s stock portfolio as a whole, depends on how wide the investor´s perspective is (Kaustia 2003)

Regret aversion is a part of the disposition effect. Having a loss in a stock market cause regret over initials of the activity and even features of cognitive dissonance, a consistency of continueing activities based on beliefs and opinions instead of more thorough judgment. Self-control means basically controlling emotion and is the factor that serves in explaining why the disposition effect is weaker at the end of the year. The rational half of the investor´s decision process recognises that realizing losses can be advantageous for tax purposes. However, the rrational half does not want to follow tax optimizing investment rules due to the factors mentioned above. Shefrin and Statman (1984) conjecture

that investors find it easier to exercise their will power in getting rid of loss-making stocks with explicit self-control mechanisms. One such mechanism is the deadline for the enf or the tax year. There is also rational reasons for not selling stock which have performed poorly but which have performed good in the past. First: they may balance their portfolio by selling winner-stocks if a large price increases have skewed the diversification. Second, they may have information which they rationally believe have not yet incorporated the price of a stock fully. Third, high transaction costs of a low value investment may make it unrational to sell loser-stocks (Odean 1998).

Disposition effect is partly a question of numbers: if a man pays 1000 money units for the house, and it´s market value goes up to 2000 money units, the price of the house is after the rise psychologically 2000. If the price of the house collapes to 1000 money units, the 2000 money units stays as intrinsic price of the house. The same goes with the stocks: for some people the intrinsic price of a stock may be 90 money units, even if the latest closing price is only 5 money units.

The disposition –effect is partly reason for the stock splits. If the price of a stock has risen constantly, the company sets the price of a stock back to the "digits" investors are used to see it. The same may occur reversely, when so called cent-stocks are given a new, more creditable price by a reverse split. Investors think that 100 € is a too high and 0.20 € too low price for a stock.

3.2 Decision making

The researchers of behavioral finance claim that a few psychological phenomena are the general source where all the for the different interpretations of behavior of decision makers are led (Shefrin 2000):

1) Heuristic-driven bias
2) Frame dependance
3) Market are inefficient

Heuristic-driven bias means, that people find thing by trial and error and this leads them to develop heuristics, rules of thumbs. Representativeness is making decision by stereotypes: the winner-loser-effect is an example of that. When investors get constant and long-lasting information about a good performance

of a stock, too optimistic views are potential to raise when analysing the investment. In some cases, the announcements of a companies have continued to build a representative bias (Barberis et al 1998).

Overconfidence guides people. If asked, 65 – 80 percent of people think they are better at driving car than average. Same kind of overconfidence in the financial markets leads to false investment decisions. Basic point is, that active trading strategy will underperform in the efficient market. There are rarely private information available and overconfident investor will overestimate the value of private information and having too much confidence in relation to information leads to too frequent trading. Trading costs and bid ask spread will make the potential extra gain to disappear. There are studies, where the differences between male and female traders are found (Barber and Odean 2000). The same way, experienced investors will perform better than inexperienced investors because of difference of confidence (Statman 2000). The stocks, that are more difficult to value are found to generate greater overconfidence among investors. To this class belongs the growth or glamour stocks, or small, illiquid stocks (Daniel et al 1998).

Olsen (1998) described the potential psychological attributes of a decision maker: his preference is multi-faceted, open to change and often formed during the decision process itself. He tend to adaptive to the environment in which the decision is made so that it contribute to their selection of a decision process and technique. Finally, a decision maker seeks rather satisfactory than optimal solution. In investment-related decision making the following features can be seen: prices don't feel right because they are not predictable. If excessive price-volatility or bubbles occur, people act as sheeps in a herd: the follow a advisors as shepherd. They sell the winning stocks too early and overreact to new market information. Investors mistake good companies for good investments and belief in the value of time diversification. Generally, people behave like applied scientists, not according the paradigms of finance and correct knowledge but mixed features like sharing, believing and hoping.

3.3 Bubbles and crashes in the stock market

Sometimes financial markets go through periods of irrational cycles and unfundamentally based values of securities. First market moves explosively upward generating unsustainable prices and then follows the crash. The upward swing may last for many years, but the crash is usually very rapid.There are a few market crashes and bubbles in the history. One of the first bubbles based on speculation was the tulip mania of the Netherlands in 1637-1637. It was caused by peak demand of tulip bulb which lifted the prices to heights. The best known crashes of a modern time are the ones of US stock market, in October 1929 and in October 1987.

There was a powerful upswing-downswing cycle also during 1999 -2001 in all the stock exchanges of developed countries, including Finland. Specially stocks of companies related to information technology had a huge burst in their returns. New technological breakthrough, World Wide Web, also known as internet and its applications and prerequisites were considered to be same kind of revolution like the tulips, railroad, the telephone, the automobile or the personal computer before in history. One explanation for the bubble was that that market sentiment got separated from market fundaments, once again.

Definitions of a bubble is:

a) an economic cycle characterized by rapid expansion followed by a contraction.

b) a surge in equity prices, often more than warranted by the fundamentals and usually in a particular sector, followed by a drastic drop in prices as a massive selloff occurs.

C) a theory that security prices rise above their true value and will continue to do so until prices go into freefall and the bubble bursts.

If the market were efficient, any bubbles would not exist. All the information would be reflected in the prices and prices would reflect the fundamentals. The contagion effect means that there becomes high concensus of prices at market

and investors rely too much to this common truth of security prices. This kind of investors are so called informational freeloaders. In a way, these freeloaders form a basics for efficient market, but there the prerequisite is, that the price and information they base their activities are right. It isn´t always the case, so speculative bubbles may occur in the stock market. It happens when the asset prices deviate form market fundamentals. Such deviations can be seen as bubbles, which reflect disturbances and craziness of market. It is not possible to derive a general definition for a bubble, the researchers could find different models for the same data used.

Treynor (1999) defined that rational behavior of individual investor can cause a market bubble. The bubble in a financial market occurs in a following pattern: Initial wealth distribution => Initial price change => Wealth transfer resulting from interaction of holdings and price changes => New equilibrium holdings and price resulting in further price change. Then the third and the fourth feature of a pattern will form a cycle which causes the market bubble and eventually crash when the investor runs out of funds.In other words, the forecaster makes repeated forecasts of a quantifiable, still uncertain future event as new information arrives. Forecasts will have an expectation: as the forecast changes, the forecaster´s expectation will change.

4. STOCK MARKET OVERREACTION

For the last 30 years, the efficient market hypothesis has been one of the most dominant themes in financial research. While the efficiency of the stock market was once virtually taken for granted, it is now being seriously questioned again, primarily due to the recent evidence on the return reversal behavior of stock prices i.e. the prior period´s worst stock return performers (losers) outperform the prior period´s best return performers (winners) in the subsuquent period. This potential violation of the efficient market hypothesis is labeled the "overreaction phenomenon" because it suggests that the market has overreacted in the initial period, and that it subsuquently corrects itself.

The efficient market hypothesis states in its strong-form that unanticipated return is not correlated with any information i.e. price reflect all existing information, be it publicly available or insider. This would mean, that prices would always be fair and no investor would be able to consistently superior forecasts of stock prices (Brealey & Myers 1988).

The overreaction hypothesis in stock market states that stocks with poor performance over a certain period of time will perform well over the next and similar time interval. This means, that winning stocks in period P tend to become losers in period P+1 and opposite. Some contrarian strategies taking a long position in past extreme loser stocks and a short position in past extreme winner stocks have been developed and exercised with success. The concept of overreaction is originally based on work of experimental psychologists, Kahnemann and Tversky (1982), who find people tend to overreact to unexpected and extreme events. DeBondt and Thaler (1985) stated that the question: what is an approriate reaction, when term overreaction carries with it an implicit comparison to some degree of reaction that is considered to be appropriate? The overreaction hypothesis claims further that investors are inclined to digest information irrationally and have a disposition of placing too much weight on more current events. In other words, investors ordinarily interpret new information, be it available or unavailable, in a systematically biased manner. They tend to be either over-optimistic or over-pessimistic, with no room in between. Under such a scenario, equity prices are not equitably determined by the "true" forces of the time, especially when new information or extreme events arrive. Although stock prices would go abnormally high or

low due to investors´ overreaction in the initial period, they have a tendency to adjust themselves back to the equilibrium level in the subsequent period. The stock price movement enjoys a systematic pattern and can be predicted beforehand under the assumption of the overreaction hypothesis. If that is the case, smart investors can exploit this opportunity of predictable reversal by implementing some sort of contrarian trading strategies for speculating or for hedging.

The basic contradiction between efficient market hypothesis and overreaction hypothesis is:

- according to efficient market hypothesis contrarian strategy should not be profitable for a investor and there should be no difference what kind of returns there has been for a security in history.

- according to overreaction hypothesis the contrarian strategy is profitable: past "loser" security should become "winner" security in the future.

A true or false conclusion reached in the overreaction hypothesis is, that even if there exists relevance to time frame of the return interval adopted, how is the situation with a risk stationary, firm size and seasonality? Furthermore, many researchers have reached results about the overreaction hypothesis in both developed and emerging markets due to the variable factors of the study process. That's why the usefulness of contrarian strategies which are built upon the overreaction hypothesis need to be investigated with an multi-angled approach.

4.1 Overreaction – empirical evidence

Some evidence to support the overreaction hypothesis and document in the literature was first presented by Rosenborg and Rudd (1982). They claimed how trader who is just concerned about the mean and the variance of the portfolio return would predict the future return by buying the stock with highest predicted returns and selling the stocks with lowest predicted returns to his portrolio. Exploiting the data about previous months returns would be able to

constitute a portfolio with good performance. The study by DeBondt and Thaler (1985), a simple stock market investment motivated by work in cognitive psychology on intuitive prediction, provided the confirmation of a price reversal over a three-year return interval are the most prominent and influential in stimulating the ongoing research: there was evidence of contrarian profits about 25 percent above the market average. Because of this finding, DeBondt and Thaler (1985) provided evidence "loser" portfolios outperform "winner" portfolios by approximately 25% and that in the U.S. equity market it would be profitable to apply a contrarian strategy. Their data consisted of stock returns of over 50 years.

In the further study by De Bondt and Thaler (1987) the objective was to find the evidence and behavioral view for the notion that many investors were poor Bayesian decision makers: they tend to overreact ie. give too much weight on the recent information and underweight the base rate data. They concluded that as a investor overreaction to earnings, the stock prices could depart from their underlying fundamental values.

Their findings for the research questions were:

1) Excess returns for losers are negatively correlated in both long and short term returns, because January effect has negative correlation for returns a prior December.

2) Difference between winners and losers cannot be attributed to changes in a risk as measured by CAPM-betas, they are inappropriate for adjusting the risk in extreme performance portfolios

3) Difference between winners and losers is not primarily a size effect

4) The small firm effect is to some extent a losing firm effect, but even if the losing firm effect is removed there are still excess returns to small firms

5) The earnings of winning and losing firms show reversal patters consistent with overreaction.

6) Investors overreact to short-term earning movements.

Zarovin (1990) pointed some critics against DeBondt´s and Thaler´s evidence on stock market tendency for losers over the prior 3-year period to beat winners during that period in the subsuquent 3-year period. He found the losers became winners, but claimed that not because of overreaction, but size effect. This is an example how different results can be get of similar data.

Fama (1998) defended the efficient market by reasoning that an efficient market generates categories of events that individually propose that security prices overreact to information. Market efficiency is however consistent with apparent overreaction and underreaction, if the frequency of both anomalies is about the same overreaction. Roughly even split between apparent overreaction and underreaction is a good description of the many of existing anomalies. If the long-term return anomalies show to be large enough, that they cannot be attributed to chance, then an even split between over- and underreaction is not sign of efficiency. On the other hand, long-term anomalies are most dependent of methodology.

4.2 Momemtum and contrarian strategies

Momentum theories assume that stock prices move slowly and smoothly over time. The contrarian theories have an opposite view about the issue: they propose the large and sharp change in price movements (Fama and Blume 1966). Ball et al(1995) claim that stock prices underreact and overreact under the continuation and contrarian theories respectively and both theories are not consistent with the efficient market theory. Long-term stock market overreaction was found in works by Clare and Thomas (1995), Larkomaa (1999) DeBondt and Thaler (1985 and 1987). Contrarian strategy realized significant abnormal returns in Jegadeesh and Titman (1993) work where they studied six month returns of US stocks during 1965-1989. The returns of the loser portfolio for subsuquent 36 months realized positive returns in each of the 12 month after the formation date.

Article of Richards (1997) explored potential explanations for reversals of national stock markets over periods of several years. He found no evidence for the hypothesis that the reversals reflect risk differentials. Test period winners

are no riskier than prior winners in terms of their standard deviations, their correlations with the world market return or other risk factors. He argued that winner-loser reversals are due to market imperfections like price discrepancies given the uncertainty in the valuation of equities. Cross-border equity flows were found to be insufficient and that implicated overreaction or "small-country –effect": if fads and investor misperceptions do exist in a small country, so international investors, who have a momemtum investment strategy, make the phenomenon even larger. US investors inflows into financial markets of another country funds often to be positively correlated with recent performance. Evidence for this fact that foreign investors are momentum traders and have a better performance than domestic investors was found by Grinblatt and Keloharju (2000) in the Finnish stock market. Sophisticated foreign investors were patient enough to wait til the time to sell was right, when unsophisticated domestic investors couldn´t act the same way. Sophistication isn´t here maybe only because of nationality, foreign investors were mostly institutions and anticipated to have better skills than domestic house-hold investors. Ekholm (2002) studie the behavior of different investor types: financial companies, companies and households. He blaimed the overconfidence to be a reason for the poor success of small, household investors: they misunderstood the information in a biased way. After a bad news small investors tend to sell buy and after good news to buy stocks: they think that the price of a stock is low, if it has come down five percent of it's a prior price. The source of their information is for example the discussion forums of internet, where some "insider" hints are given for free.

According to Hong and Stein (1999) there are two types of investors in the market: newswatchers (informed traders) and momentum traders (liquidity traders). The news watchers trade only on the private information about fundamentals, momemtum traders trade only on past price movements. The overreaction is caused by momemtum traders. Daniel et al (1998) states that prices initially overreact to news about fundamentals and continue to move away, before reverting to fundamental value eventually.

Some confirmations for the short-term overreaction hypothes has been found in the world´s stock markets. Brown and Harlow (1988) and Atkins and Dyl (1990) provide evidence that significant price reversals would follow scurities that experience one-day price declines. A similar result of a three-day price recovery

for Fortune 500 firms suffering price declines of 10 percent of more is documented by Bremer and Sweeney (1991). Cox and Peterson (1990) find significant reversals in study where NASDAQ stock returns followed one-day price declines of at least 10 percent.

The return of the positive returns from three to twelwe month holding period by buying loser stocks and selling winners was found by Jegadeesh xand Titman (1993). Chang, McLeavey and Rhee (1995) viewed the monthly abnormal returns earned by implementing a short-term contrarian strategy in the Japanese stock market. They noted that Japanese contrarian profits are due mainly to market overreacton or to a lead-lag structure in share prices. In Japan the January –effect was not a critical factor. They found, furthermore, that there are abnormal profit whether the losers are smaller of greater than winners and the magnitude of the profits does not differ. For the last, strong symmetry exists between the performance of the two extreme portfolios. Support for the magnitude effect is presented in the study of Pettengill and Jordan (1998): the firms with the greatest monthly loss becoming the greatest winners in the next month.

The empirical findings that favor the overreaction hypothesis, both short term and long term, are substantial. Some researchers, however, suggest different explanations for this market inefficiency. Cox and Peterson (1994), for instance, are in belief that price reversal is the combined result of a bid-ask bounce and the extent of market-liquidity, and they don´t find evidence consistent with an overreaction hypothesis. Ball et al (1995) detect that the apparent one-week profitability of contrarian trading strategy is largely disappeared after calculating returns from bids instead of ask prices.

The key features of the short-term contrarian strategies implemented in previous works of were investigated in study of Conrad and Gultekin (1997). First they analyzed the possibility of overreaction in financial markets. They remind that even if virtually any model of overreaction gives the result that returns are negatively autocorrelated for some holding period, the measurement errors in stock prices will also lead to negative autocorrelation in returns. The studies that show positive due to price reversals, may not be evidence of the overreaction but may instead be a consequence of market microstructure effects, such as the bid-ask bounce. Second they showed that

low levels of transaction costs eliminate all profits to strategies that try to benefit from overreactions of markets. Amount of the transactions costs documented could be less than 0.20 %. Data of their empirical analysis was limited to NASDAQ firms in 1985 – 1989 period and NYSE firms in 1990 – 1991. All the documented profitability of price reversals of NASDAQ and the most of the price reversals of NYSE could be explained by bid-ask bounce.

Using the same data but a longer event in their study, contrarian strategy realized significant abnormal returns in Jegadeesh and Titman (1993) work where they studied six month returns of US stocks during 1965-1989. The returns of the loser portfolio for subsuquent 36 months realized positive returns in each of the twelwe month after the formation date. Zarowin (1989), controlling the size and January effects, also leads support for the short-run overreaction hypothesis via the use of a one month return performance.

In addition to the problem of the bid-ask spread, some other puzzles such as firm size effect, seasonality, and risk stationarity have been proposed. Chan (1988) using a simple asset pricing model, the CAPM, to control the risk change, observed a very small return from contrarian investment strategies which might not be economically significant. Ball and Kothari (1989) further proved that the model and estimation methods used to evaluate the overreaction hypothesis are sensitive to the results because of the time-varying risk of arbitrage strategies. Supporting arguments of January effect, Pettengill and Jordan (1990) also provide evidence that most of the overreaction arises in January.

As for the firm size, Zarowin (1990), applying a three-year test period, finds the contrarian investment strategy works well only for small firms. Zarowin (1989) however proposes that even if the long-run overreaction effect may be subsumed by size and seasonality the evidence indicated by using monthly return suggests the stock market appears to be characterized by short-run overreaction.

4.3 Stock market overreaction in Finland

Fast (1992) studied the the short-term overreaction in Helsinki Stock Exchange. The period was from 1979 to 1988 and data consisted of all the stock series. His first hypothesis was, that there is significant short-term overreaction in the Finnish stock market (the directional effect) and the second hypothesis that the possible overreaction would depend on the power of the initial effect, (the magnitude effect).

The return was counted:

(4) $$ER_{it} = r_{it} - a_i - b_i r_{mt}$$

Where:

Abnormal return of a stock i during test period t = stock i return during test period t – alfa and beta coefficient tested by market model during test period t x return of a market during test period t.

There existed both directional and magnitude effect in the Helsinki Stock Exchange and hypotheses held the test. The concluding remark in this study was however the fact that result may be influenced by thin trading and powerfully random movements of stock prices.

Mänttäri (2005) couldn´t confirm Fast´s (1992) findings. He didn´t find economically meaningful short-term over- or underreaction based on the previous short-term price behavior of the winner and loser portfolios. There may exist periodical overreactions, but when more stocks are investigated for the longer period, the overreaction is no longer indicated. Further finding was, that foreign investor drive the market, and there may exist overreaction due to their actions, but these are unpredictable and thus impossible to exercise in sense for trading.

Long-term overreaction was studied in the Finnish stock market by Larkomaa (1999). The attempt was to find answers if the overreaction is similar in small emerging exchange and in international exchanges and if the overreaction effect could be used to alternative risk estimation approaches. Further, the anomalies

like January-effect and size-effect were to be found if they existed simultaneously with overreaction and the risk-adjustment seemed to strenghtenthe reversal effect in portfolios. The data of the study was 1970 – 1996. The quality of data set some challenges to researcher, but he found the overreaction in the narrow Finnish market. Footnote was, however, that the Finnish stock market has experienced a dramatic structural changes over decades and even if the purpose of the study was to give viewpoints to the international discussion, it may be difficult.

Believers in efficient markets may say that this procedure should not work in informationally efficient markets since stock prices would react instantaneously to "news" about the firm, or the economy. Therefore, securities will quickly become correctly priced. But some researchers do not believe that the market always responds rationally. Skeptics often claim that the market has a short-term obsession with earnings and the market overreacts to news. Further, the skeptics claim that this overreaction creates opportunities for investors to buy solid stocks at attractive prices. Therefore the question remained as an empirical question (Högholm & Prather 1998).

4.4 The Helsinki Stock Exchange

The Helsinki Stock Exchange opened on October 1912. In London, England, the stocks were traded already on 16th century, and probably the best known stock exchange, New York in USA was founded in 1792. Helsinki Stock Exchange It remained a so called free form financial association until in 1984 when it was converted into a co-operative owned by banks, traders, other companies and associations. On April 1, 1990 trading was transferred to a new digital system called HETI (at once in Finnish) which replaced the electro-mechanical trading board introduced in 1935. Digital trading system HETI has enabled remote traders to do transactions on equal terms with those in the trading room.

Since 1995 the co-operative has expanded its activities and merged with several clearing and stock deposite companies and associations. There has been established a powerful organisation for markets of Northern Europe: in 1998 the company bought the Finnish derivative exchanges in 1998 and was re-named to HEX, in the beginning of the 21st century HEX acquired a majority of the Tallinn Stock Exchange in Estonia and Riga Stock Exchange in Latvia and in 2003 HEX merged with OM AB, owner of the Stockholm Stock Exchange in Sweden. The new company was later renamed to OMX.

One important milestone of the history of Helsinki stock exchange happened in 1993 when the foreign ownership was freed. Nowadays foreign investors are responsible from 50 percent even to 70 percent of the daily trading volume.

There are three main indexes in the Helsinki Stock Exchange: the all-share index, the cap index and the index that consists of 25 most actively tradet stock of the exchange.

The oldest of the indexes, all-share index was established in 1987. The OMX Helsinki All-Share Index, as it has been called after the fusion in 2005, includes all the shares listed on the Helsinki. The goal of the index is to reflect the current status and price changes in the market. The OMX Helsinki Cap index is weight capped version of all-share index where the maximum weight of one share is limited to 10% of total market value of the index.

OMX Helsinki 25 is the leading share index of Helsinki Stock Exchange. It consists of the 25 most actively traded stocks on the Helsinki Stock Exchange and is a capitalization weighted stock price index. The maximum weight of one company is limited to 10 percent and the composition of the OMXH25 index is revised twice a year. The numbers of shares used to compute the market value are determined on a quarterly basis. The limited number of participants guarantees that all the underlying shares of the index have excellent liquidity, which results that the index is highly suitable as underlying for derivatives products. OMXH25 is used as a benchmark index for management of diversified Finnish stock portfolios.

Helsinki Stock Exchange index was established in 1987. In the beginning of the 1990´es there were a depression in the Finnish Economy, which can be seen in the stock exchange as well: the lowest value of index was 541 points in September 1992. In the end of 1990 ´es and in the beginning of the 2000´es there was a massive burst in value of shares: HEX-index reached its all time highest valuation in March 2000, 18277 points.

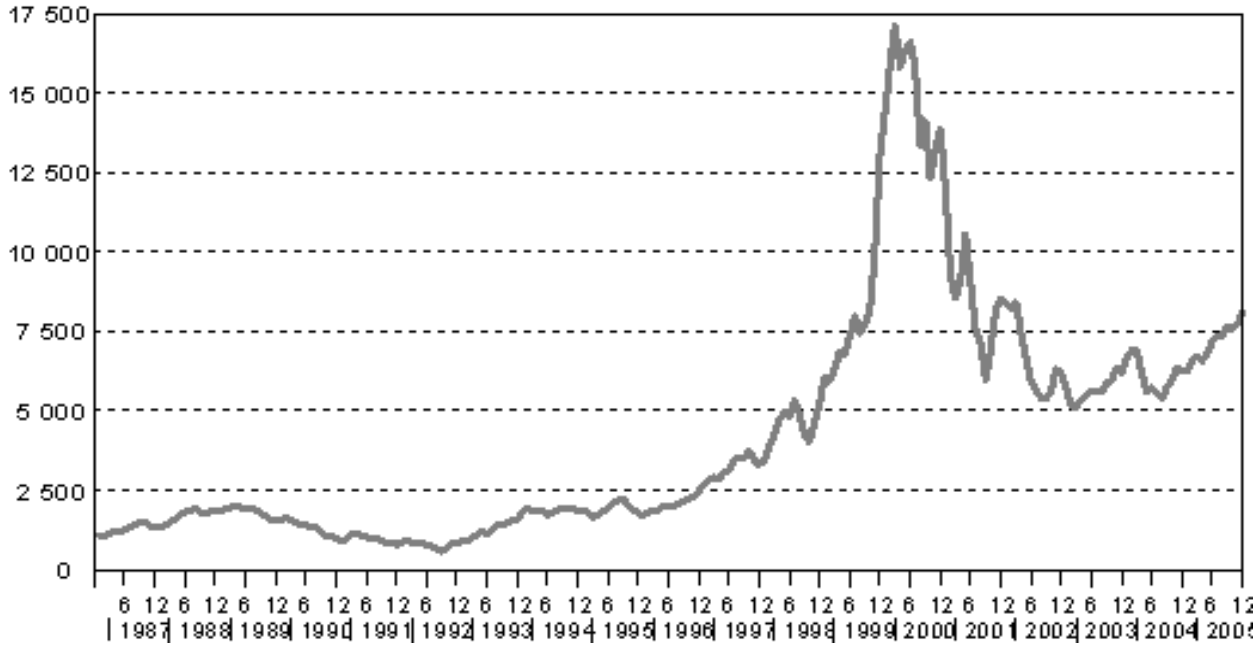

Figure 2 Helsinki Stock Exchange all-share index 1987 -2005.

5 DATA, METHODOLOGY AND THE RESULTS OF A STUDY

5.1 Time period and selection of data

Stock return price data for this study was from database of Department of Accounting and Finance of University of Vaasa. Primary ata contained all the shares of Helsinki Stock Exchange OMX and its time window is from January 1st 2002 to December 31st 2007. There were 1572st observated closing prices for a single company, which had a traded share in the marketplace for the whole time period of the study. In the empirical studies where the data window is for example from the beginning of the 20th century to 21st century, there are thousands of observations of extreme returns. Question is, if the number of observations is the correcting factor in the case of old data and old-fashioned market formation.

There existed some questions of selecting a decent data for the study: of all the stocks Large and Mid Cap companies of the Helsinki Stock Exchange were accepted because of proper price formation and a sufficient volume of trading. Stocks of small cap companies were rejected because of possible illiquidity and bid-ask spreads. For example, return of a so called cent stocks may vary from 0.06 cents to 0.07 cents and then back to 0.06 cents. If this data would be accepted, it would skew the result badly when the observation accepted is + or -10 %: every 0.06 cents to 0.07 cents would be a observation, but the trading strategy can not be based to these. This takes out the effect of the size-effect, where smaller companies show abnormally high returns when compared to bigger. Also another limitation was executed: there are firms which have stocks with two different series. Because of the some special features of these stocks, only the common stock of these is accepted and preferred stocks are rejected of the study. Price behavior of these two series may be similar, but the exploitation of the notion of a one company twice in form of a finding or occasion, 10 % price reversal, would give too much weight on the result and is thus rejected. Dividends and splits were taken into account and rejected of the data used.

During the study window, the Helsinki Stock Exchange index has developed in a curve seen in the figure below. The reason for rejecting the data a prior year 2002 was that there existed the bubble or cycle in the stock prices, especially between the years 1999 – 2001 which would have pictured the abnormal result and non-usable implications for the possible trading strategy proposed. The

development of the prices in the Finnish stock market has been more moderate during 2002 – 2007 and thus suitable for a study like this.

In the figure of price development of the Helsinki Stock Exchange it can be seen that the returns have risen slowly, but fallen in shorter period of time. Even if there has been fluctuation in the market during 2002 - 2007, the prices have been acting in a relatively smooth way.

Figure 3 OMX Helsinki index July 2001 – January 2008.

5.2 Method of the study

The method of the study was time-series return prediction. First the stock which have had there returns of over 10 % in a one day were picked and investigated to which direction the returns reverse (if) in the next day and four days after that. Both "winner-stocks", that is, stocks, which have had a return of + 10% or more in a one day and "loser-stocks", which have had a return of -10% or less in a one day were selected to be findings of the study.

Brown & Harlow (1988) proposed three different effects to be a simple summation of overreaction hypothesis based on DeBondt and Thaler (1985):

I The directional effect, i.e. extreme movements in equity prices will be followed by movements in the opposite direction
II The magnitude effect i.e. the more extreme the initial price change, the more extreme the offsetting reaction
III The intensity effects i.e. the shorter the duration of the initial price change, the more extreme the subsequent response.

The question of this study was to see if there exists directional effect of the overreaction hypothesis in the Finnish stock market. If there exists reversal in returns of stocks, that have lost over 10 % of their value in the day before, can it be used to adapt a contrarian trading strategy. Fast (1992) had found the support for the directional and magnitude effect in the Helsinki Stock Exchange, but because the basic assumption of this study was, that there occur large reversals in returns in stock market nowadays, but they are usually not 20 % or 30 % of a prior price, so the magnitude was left out of the study range. The time window of the study was 1, 2 ,3 ,4 and five days after the initial price change of over 10 %, so the intensity effect was studied. The main interest was, still, the behavior of the stock in the first day after the extreme movement.

Brown and Harlow (1988) used the formula:

$$u_{it} = r_{it} - E(R_{it}) \quad (5)$$

where

u_{it} = cumulative excessive returns of a stock i in time t

r_{it} = return of a stock i in time t

$E(R_{it})$ = expected return of a stock j in time t

They corrected the systematic risk of the study by rejecting part of cumulative excessive returns when the market had been acting to the same direction.

In this study there are no calculated the return of a market portfolio, because of its expected minor effect in time window from one to five days and because of the rapid change in the price of one stock.

An event study is a method of empirical study of a prices of a securitys before and after an for example announcement, divided or merger. It is used to make predictions of the behavior of a price of security in the future. Using the

financial market data, it measures the impact of a special event at the market. Event study if fast and useful because it shadows the effect of an event immediately in security prices, when some information can be seen even months after the original event. An event study is a direct test to market efficiency where the joint problem is not major problem.

Event study is has many applications and is a wide spread in accounting an finance research, but the most often used field is a effect of a event like mergers and acquisitions, earnings announcements, issues of new dept or equity and variety of macroeconomical issues (MacKinlay, A.C (1997).

Event study is a test for a rapid price adjustment, where purpose is to measure stock markets response to a particular information release. In this study the initial information release is the rapidly changed abnormal return of a stock. In event study the data is a stock and market-index return and the estimation period varies from 260 to 10 days a prior the event, here in this study the assumption of the returns before are irrelevant because the fast reaction is measured. In the event study the significance must be tested.

A measure of location or central tendency is a way of describing a large frequency distribution by means of a single value. The data to be analysed must be at least of interval status. The main measures of location in common use are the mean, the median and the mode. The mode is the most frequently occurring value in a frequency distribution and the mean is the arithmetical average of a frequency distribution, but of these three are median and mode not a study interest of this subject (Hussey and Hussey 1997).

Mean is used to discover the general returns of the stocks the day after a initial + or – 10 % change in the closing price.

The formula of the mean is:

(6) $$\text{mean} = \sum x / n$$ where

x = each observation

n = the total number of observations

$\sum$ = the sum of

When positive of negative change of 10 % was found in stock price, it was found out what kind of closing prices there were for the next five days each separately.

5.3 Results of the study

In this study there were positive and negative 10% one day closing price returns investigated. Data consisted of daily returns of Helsinki Stock Exchange OMX Large and Mid Cap stocks during 1.1.2002 – 31.12.2007. Small Cap stocks were rejected because of possible big bid-ask spreads, lack of market liquidity and other skewnesses in their returns.

There were 127 pieces of positive and 135 pieces of negative occasions found, where the daily return exceeded ± 10%. Companies included were totally 64.

5.3.1 The year of the observation

The highest frequency of findings was in the beginning of the study window: in a year 2002 and 2003 there were 48 and 32 findings in +10 % daily return section and 41 and 20 in -10% daily return section. In 2005 and 2006 there were only 6 and 7 winner observations and 22 and 35 observations summed. In 2002 and 2003 there were notable fluctuation in the market, but from year 2004 to 2007 the market has been developing steadily.

Year	Winner	Loser
2002	48	41
2003	32	20
2004	14	21
2005	7	22
2006	6	16
2007	20	15
N	127	135

Table 2 The year of the observation

5.3.2 The month of the observation

The most common month of +10% returns was October with 25 occasions. In January there were 17 occasions, but all the other months had under 15 observations. In the month of December there were only 5 pieces of +10% returns found. In January there has been anomaly found but October can not be explained in that sense. The most of -10 % returns was observed in July, 20 occasions. In August there were 15 occasions and in April 16 occasions. The least -10% days there were in June, 5 pieces. In January, February and December there as well only few, 6 occasions in each month. Standard deviation is for negative months 4,64 and for positive months 5,96.

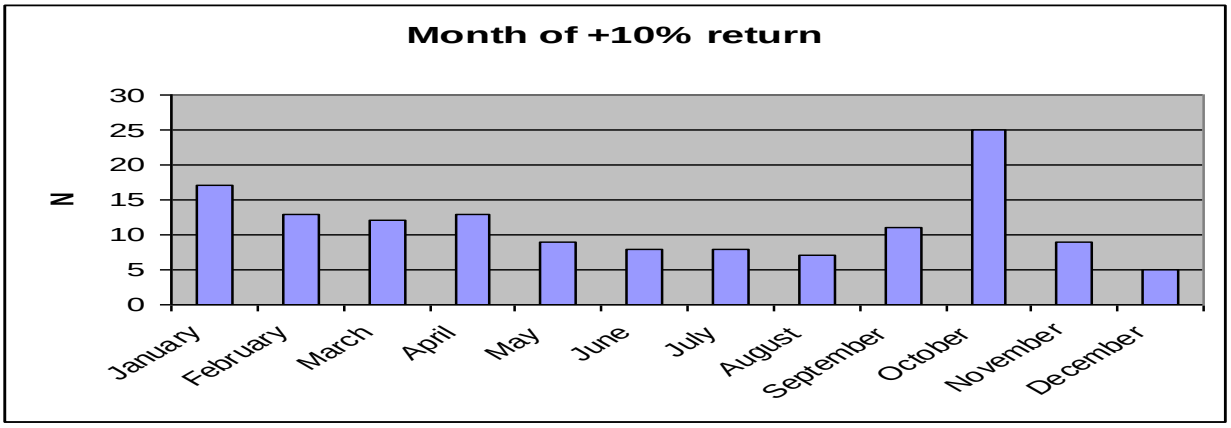

Table 3 The month of +10% return

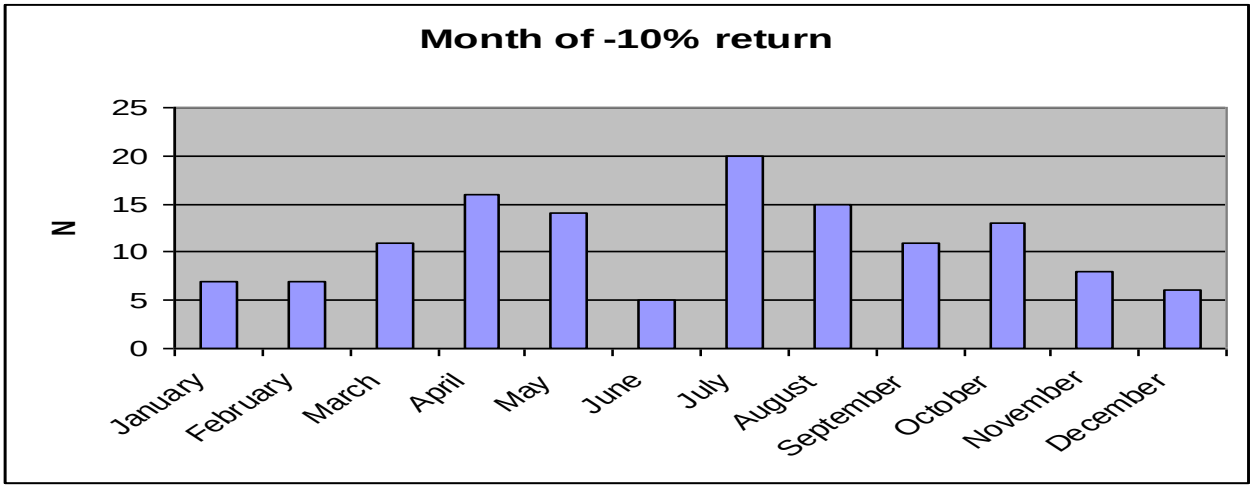

Table 4 The month of -10% return

5.3.3 The day of month of observation

In the stock markets of world there has been found a anomalies referring to abnormal returns in a specific day of the week. Here it is shown that in case of + or - 10 % return doesn´t happen in any specific day. There are 10 findings in the second day of month and seven findings in the 11th, 18th, 23th and 25th day of the month, but special pattern can´t be seen in negative portfolio. In a negative portfolio the most populated day is the 18th with 10 findings and 26th with 9 findings. According to table 6, the negative return doesn´t happen in the 4th, 19th or the 24th day of the month.

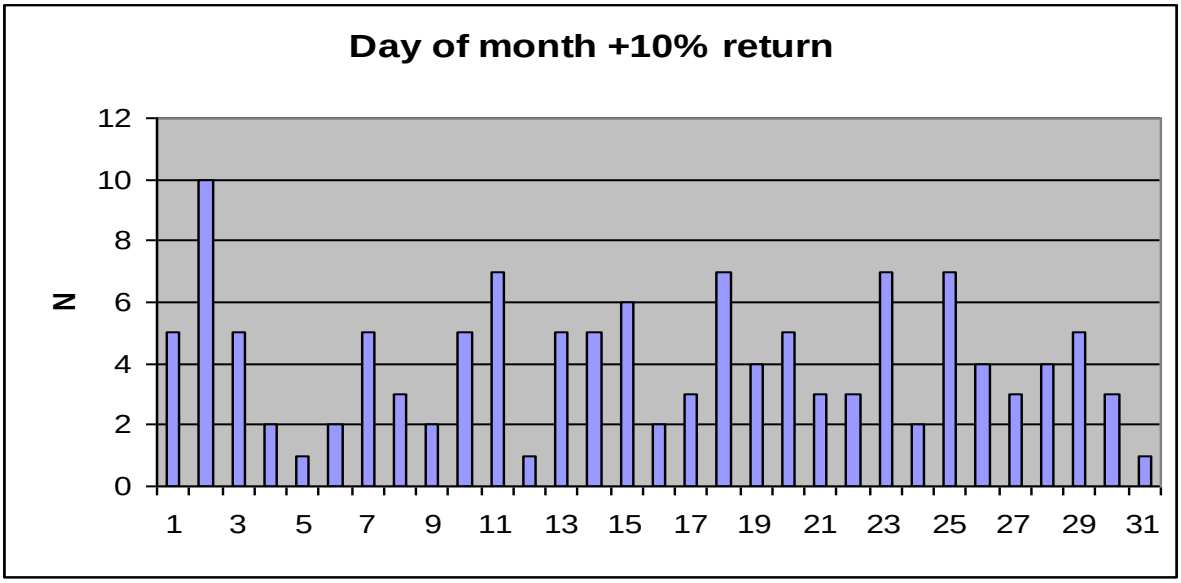

Table 5 The day of month +10% return

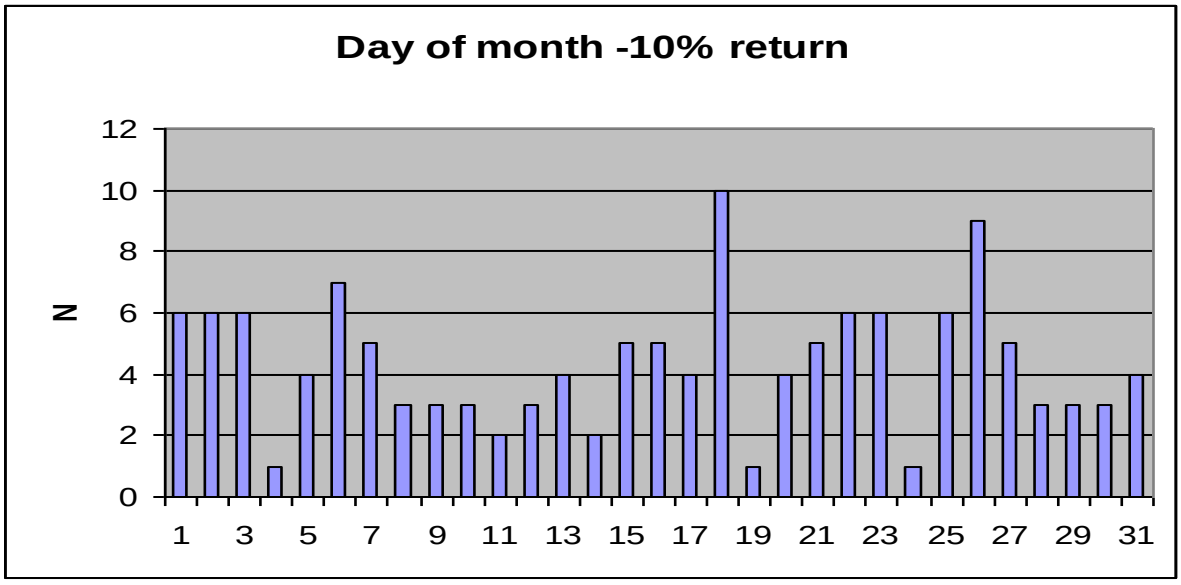

Table 6 The day of month of -10% retur

5.4 Returns from day one to day five, the original data

There can be seen a clear sign of a reversal in a return in day 1 after the +10 % and -10% return. In the first day after +10% return, so called winner side of the phenomenom has a average return of -0,544 %. In the first day after -10%, so called loser stocks give return of 1,258 %. Difference between these two returns are 1,769%.

Cumulatively the direction to the return seems to be born in the first day: there is no massive returns during days 2,3,4 or 5 after the initial price change of +- 10 %. In the day two after the ±10% return there doesn´t occur that kind of reversal in returns except in the day three in the winner side, where the return is -0,359 percent. Similarly, the return of the day 2 in the winner portolio is somehow abnormal by 0,313 %.

Day	Winner % mean	Loser % mean
1	-0,544	1,258
2	0,313	0,159
3	-0,359	0.164
4	0,049	0,127
5	-0,059	-0,021
Cumulative return	*-0,057*	*1,692*

Table 7 The returns of winner and loser portfolios

DAY	Winner Z-test	Loser Z-test	Winner standard deviation	Loser standard deviation	Confidence interval 95% W	Confidence interval 95% W	Confidence interval 95% L	Confidence interval 95 % L
1	0.4999	0,4997	4,377	4,213	(-1,305	0,217)	(0,564	1,969)
2	0,4994	0,4865	3,701	3,164	(-0,331	0,957)	(-0,375	0,693)
3	0,5005	0,5152	3,178	2,636	(-0,912	0,194)	(-0,279	0,607)
4	0,4995	0,5014	3,361	3,364	(-0,518	0,616)	(-0,143	0,677)
5	0,5009	0,5014	2,659	2,997	(-0,521	0,403)	(-0,559	0,601)

Table 8 Z-test, standard deviation and confidence intervals

5.4.1 Returns from day one to day 5, smoothed data

In the next operation the ten most extreme daily returns are rejected of the findings of + or – 10 percent returns. Five positive and five negative findings were deleted of the portfolio. The result is that the first day pattern remains basically the same as in portfolio formed of the original data with all the findings.

There can still be seen a clear sign of a reversal in a return in day 1 after the +10 % and -10% return. In the first day after +10% return, so called winner side of the phenomenom has a average return of -0,452%. In the first day after -10%, so called loser stocks give return of 1,232 %. Difference between these two returns are 1,684%

Cumulatively the direction to the return seems to be born in the first day: there is no massive returns during days 2,3,4 or 5 after the initial price change of +- 10 %. In the day two after the + or – 10% return there doesn´t occur that kind of reversal in returns except in the third day of the winner portfolio, where the return is almost as big as in the day 1, -0,443 %.

Day	Winner % mean	Loser % mean
1	-0,452	1,232
2	0,138	0,068
3	-0,443	0,098
4	-0,094	0,019
5	0,027	0,278
Cumulative return	*0,024*	*1,701*

Table 9 The returns of winner and loser portfolios, smoothed data

DAY	Winner Z-test	Loser Z-test	Winner standard deviation	Loser standard deviation
1	1	0,004	2,479	3,127
2	0,635	0,711	2,525	2,631
3	0,997	0,554	2,473	2,564
4	0,616	0,874	2,664	2,358
5	0,982	0,878	2,133	2,503

Table 10 Z-test and standard deviation, smoothed portfolios

5.5 The daily returns

5.5.1 The first day

In the first day after 10 % change in a stock´s price, a some reverse movements can be found in return patterns. In a winner-figure there are about 60 occasions where the return is negative, about 30 neutral and about 40 where return is positive after initial return of over 10%. Mean of the a prior winner´s is thus negative, -0,544%. In a a prior loser portfolio there are more positive than negative returns: mean of the loser´s is 1,258 %. There are more references to the side of magnitude effect proposed by Brown and Harlow (1988): five occasions reverse 10 % after the initial movement -10% or over.

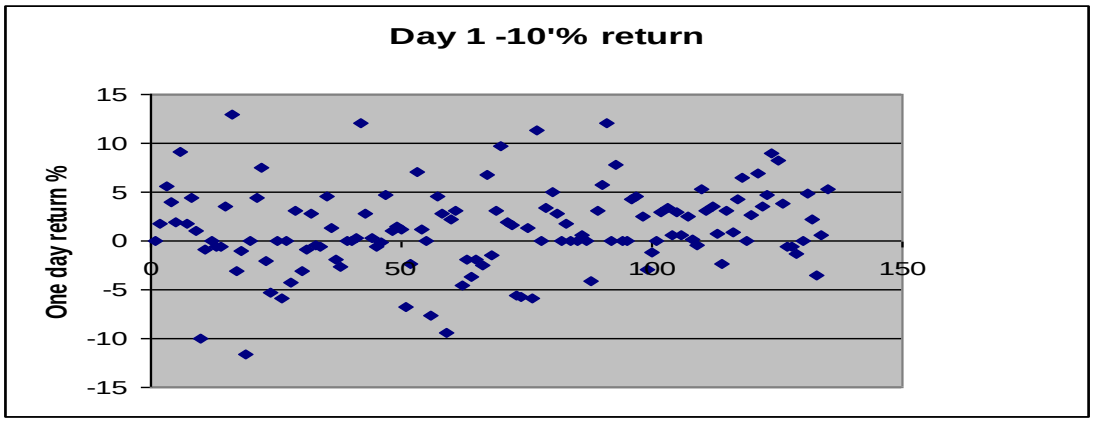

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Figure 4 The first day after -10% return

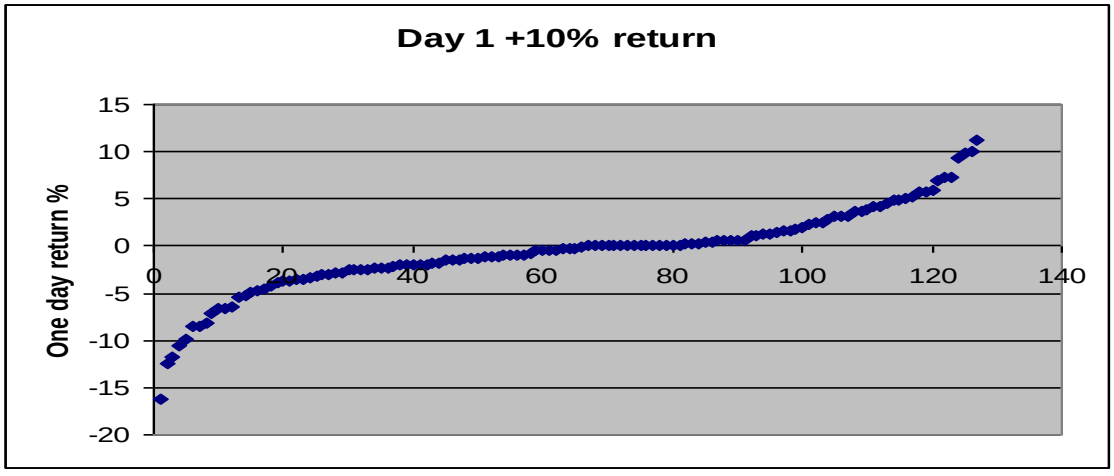

Figure 5 The first day after +10% return

5.5.2 The second day

In the second day the mean of the groups are 0,313 % for winners and 0,159 % for losers. The day before the winners had a negative return, but in the day 2 the winners have in average a better return than losers. Smoothed returns, 5 most extreme negative and positive returns rejected giver the result 0,138 % for winners and 0,068 % for losers.

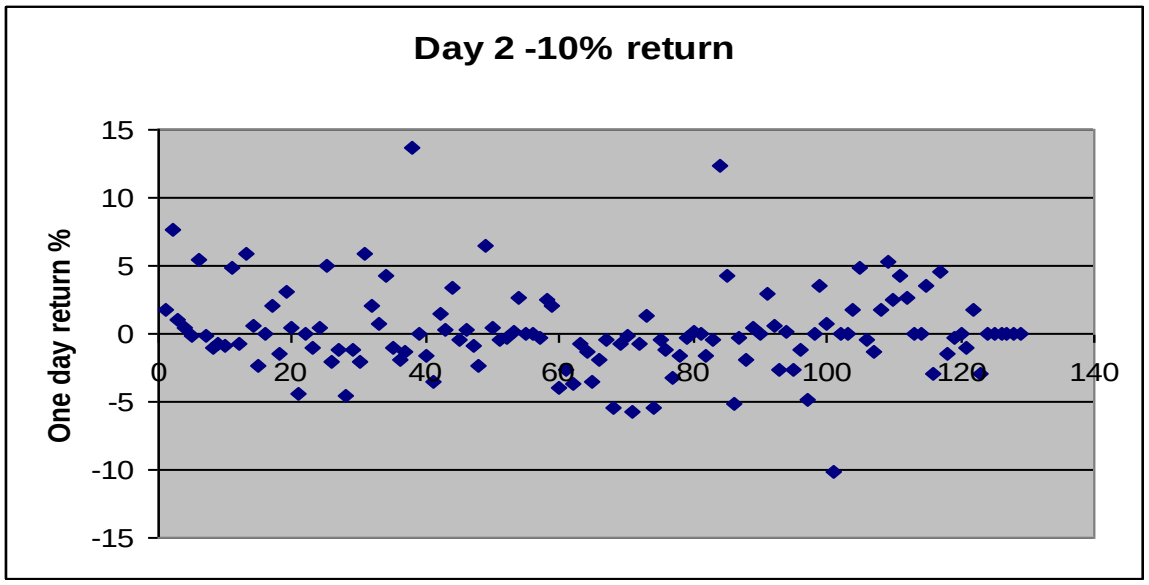

Figure 6 The second day after -10% return

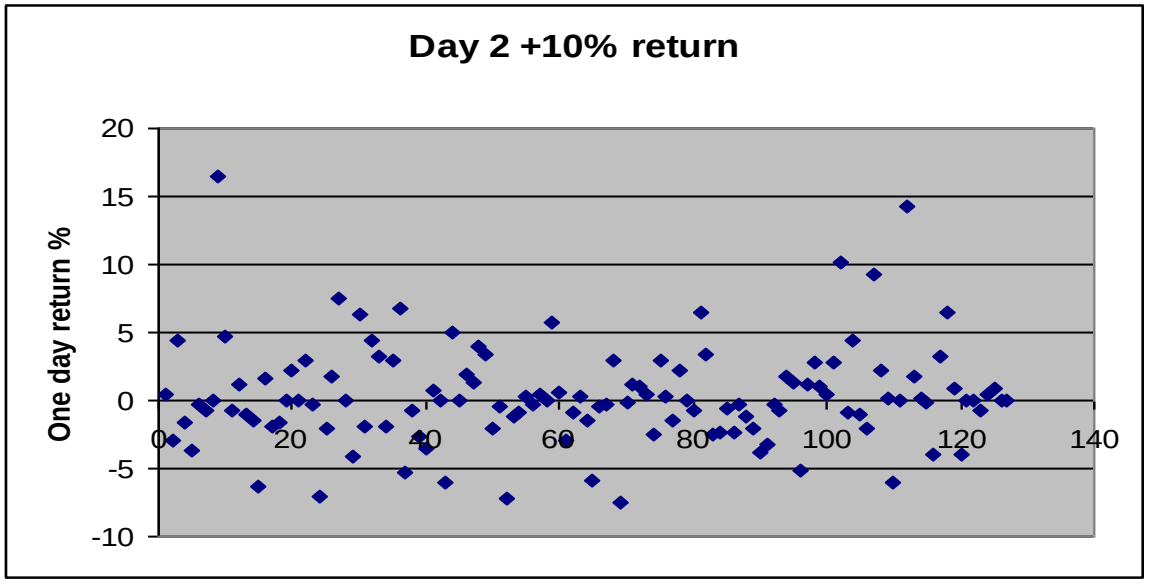

Figure 7 The second day after +10% return

5.5.3 The third day

In the third day the mean of the groups are -0,359 % for winners and 0,164 % for losers. The day before the winners had a positive return, but in the day 3 the losers have in average a better return than winners. Smoothed returns are -0,443 % for losers and 0,098 % for winners.

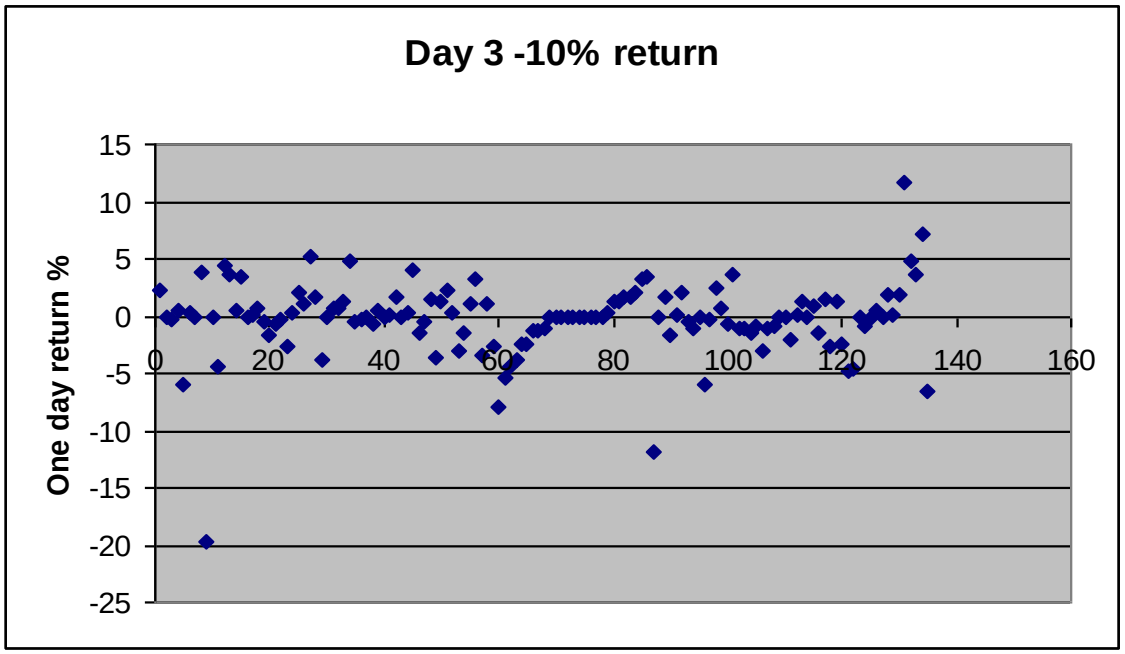

Figure 8 The third day after -10% return

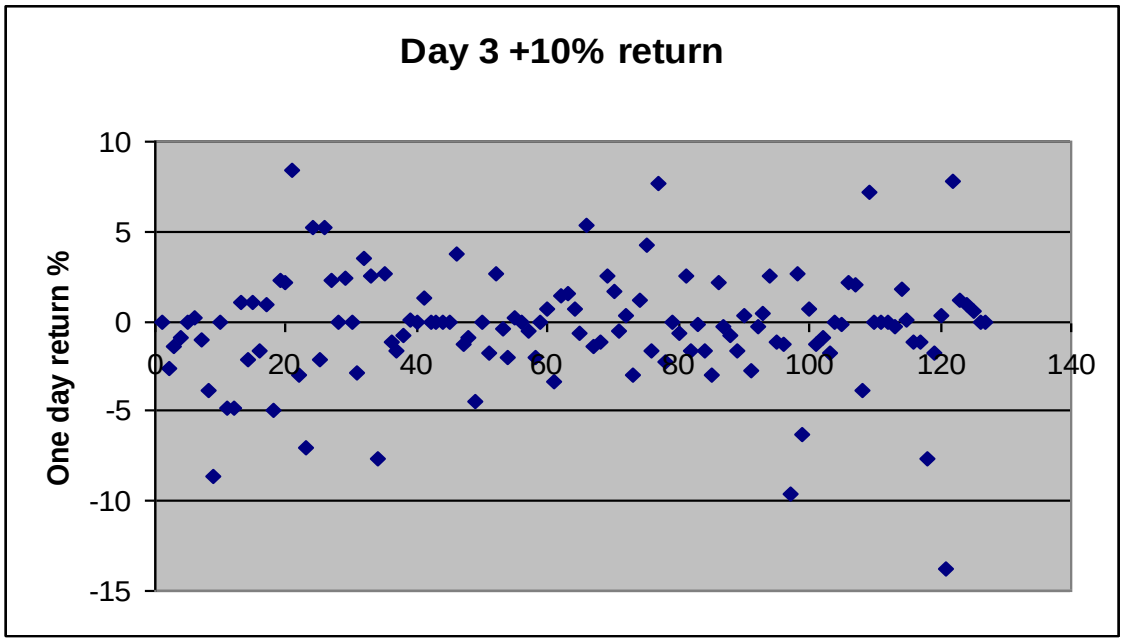

Figure 9 The third day after + 10% return

5.5.4.The fourth day

In the fourth day the mean of the groups are 0,049 % (-0,094%) for winners and 0,127 % (0,019%) for losers. The day before the winners had a negative return. In the day 4 the losers have in average a better return than winners.

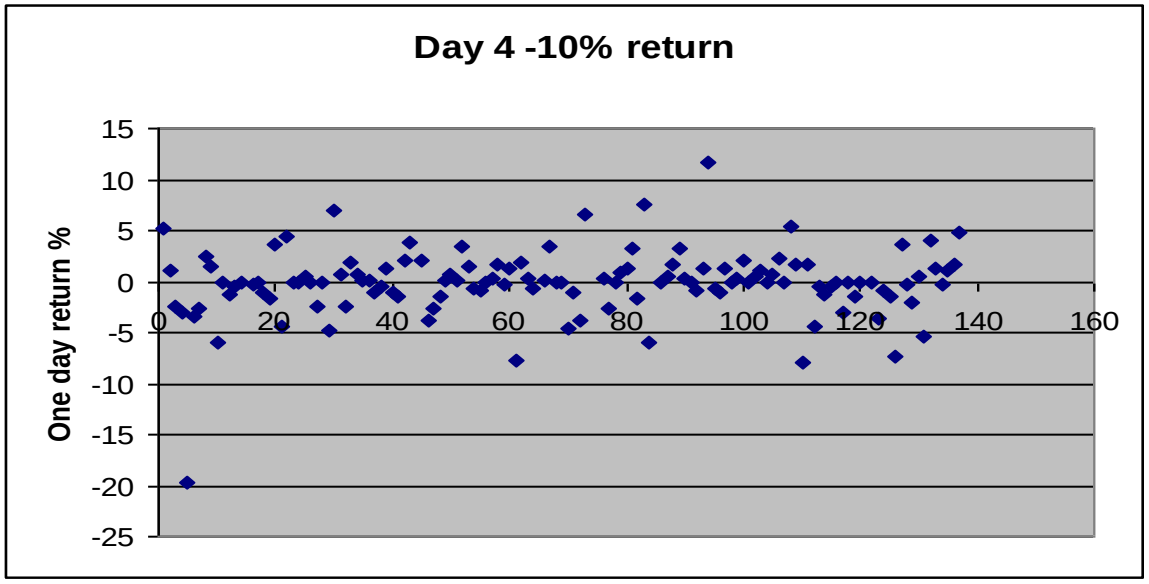

Figure 10 The fourth day after -10% return

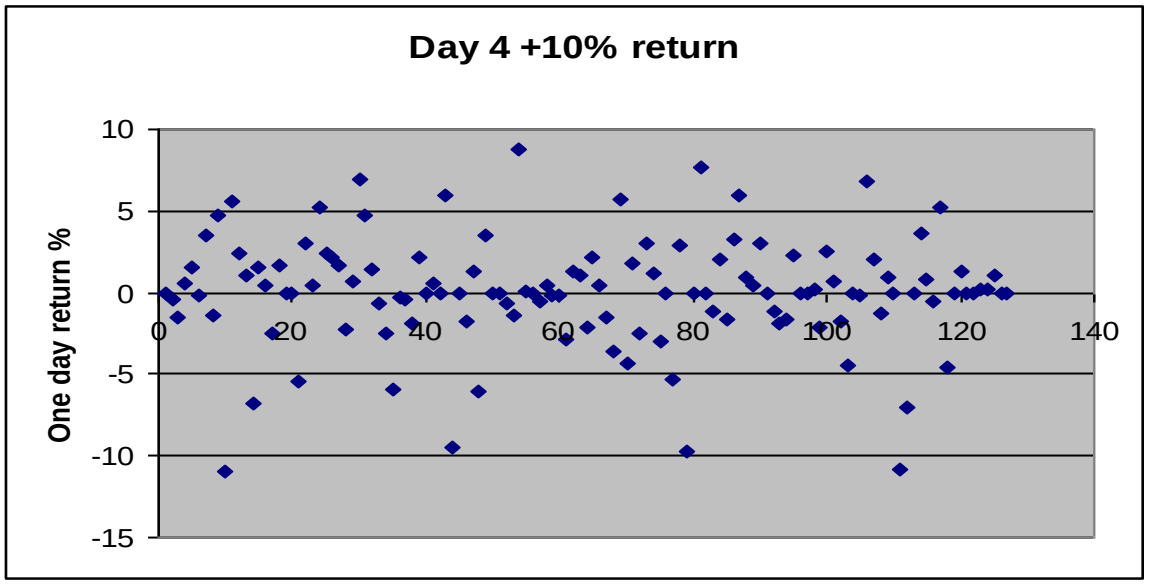

Figure 11 The fourth day after +10% return

5.5.5. The fifth day

In the fifth day the mean of the groups are -0,059 % for winners and -0,021 % for losers. The day before the winners had a positive return. Losers have negative return of -0,021%. The smoothed returns are 0,027 % for winners and 0,278% for losers. The losers benefit of rejecting 10 findings -0,021% => 0,278%

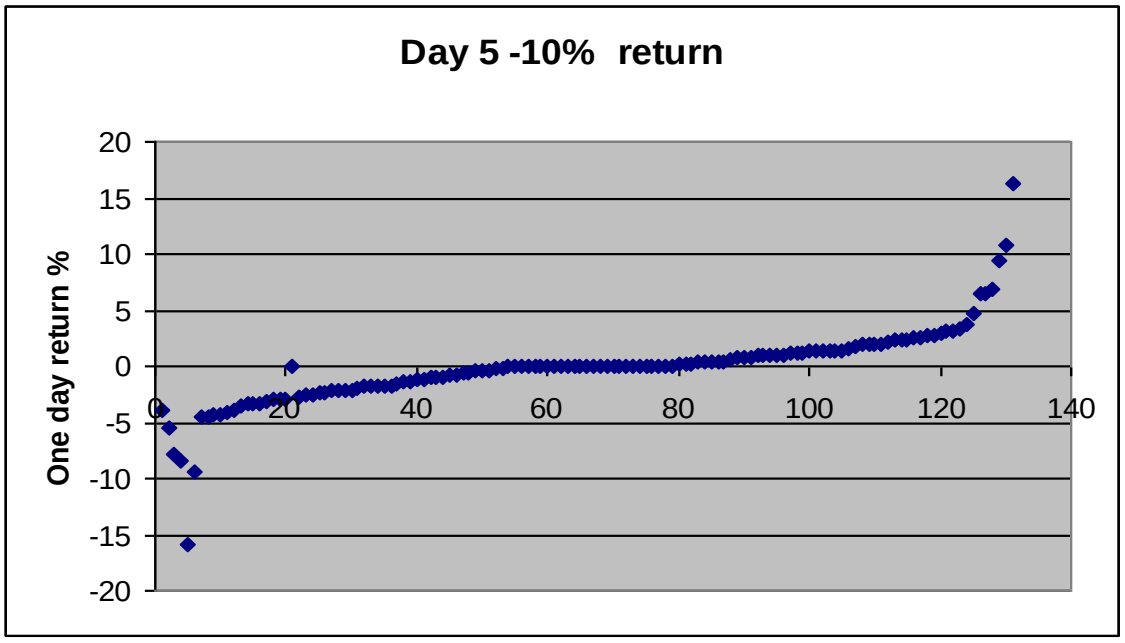

Figure 12 The fifth day after -10% return

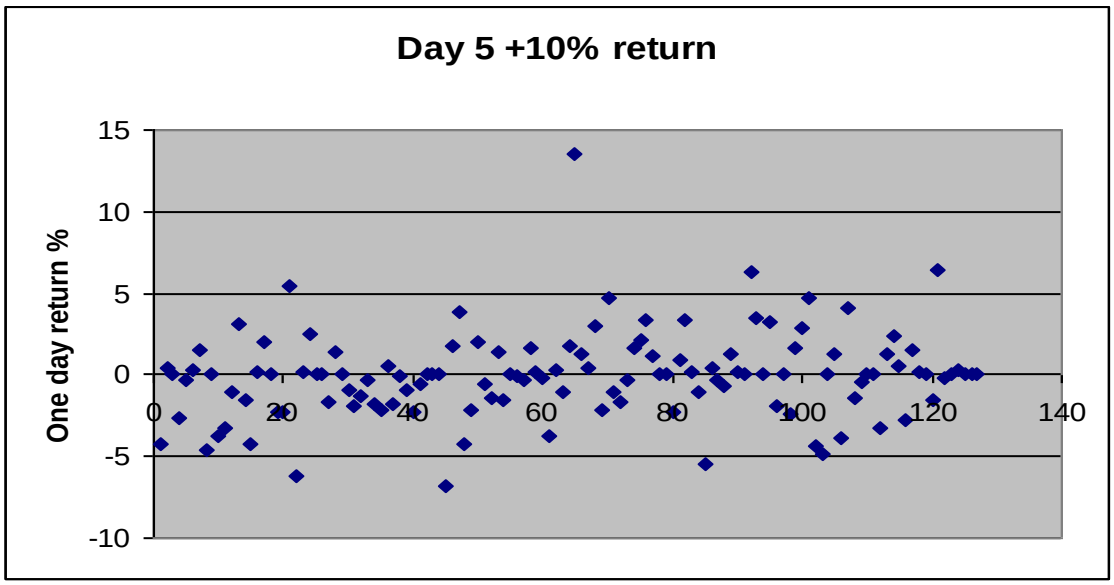

Figure 13 The fifth day after +10% return

5.6. The study question and the hypotheses

Study questions of this thesis are: Is there a directional intensity effect of the overreaction hypothesis in the Finnish stock market? Does the efficient market hypothesis hold in the Finnish stock market? Can there be a trading strategy adapted of the behavior of prices in case of overreaction?

The hypotheses of the thesis are:

H1: There exists the price reversal as implication of directional effect of overreaction hypothesis in case of extreme price movements in the Finnish stock market.

H2: If the evidence of the overreaction exists, it is corrected by market in subsuquent days as implication of market efficiency hypothesis.

H3: There can be formed a profitable trading patterns based the price behavior of stocks in case of overreaction.

Empirical findings of the study present, that the first hypothesis holds. There exists a directional effect of overreaction hypothesis in the Finnish stock market. The returns of a portfolio of stocks which have had over -10 percent daily return, have return of 1.25 % in the next day. The scale of a average return of a stock is roughly 1 % in one month. The returns of a stocks which have had over +10 % daily return, have return of -0,54 % in the next day. The empirical finding support the second hypothesis, too. The overreaction effect is strongest in the first day after the initial return of ± 10 % and disappears during the next four days. The third hypothesis is rejected: there exists an overreaction in a prior -10% loser stocks, but the magnitude of the effect isn´t enough for profitable trading activity. There isn´t a clear pattern for a specific day of month of occasion to be a prediction of purchases of stocks. The hypotheses summarized are:

H1 = > accepted
H2 = > accepted
H3 => not accepted.

6. CONCLUSIONS

The basic contradiction between the efficient market hypothesis and the overreaction hypothesis is that the efficient market hypothesis presumes a contrarian strategy shouldn´t be profitable and there should be no difference what kind of returns there has been in the past. Overreaction hypothesis states that there should occur a price reversal in a returns of stock in case of a extreme price movement: past loser securities become winner securities in the future and thus a contrarian strategy should be profitable.

Modern stock markets of different countries are tested to be efficient by several empirical tests, at least up to a certain level. Variety of anomalies, for example occasional over- and underreactions violate against the hypothesis of market efficiency, but if they are apparently as common, they aren´t actually a proof of inefficiency, but efficiency. Price of a share may deviate from the fundamental value of a share, but the efficient market corrects the situation over the time and prices will eventually reflect the nearest actual value of a share.

Stock market is efficient most of the time. When is the time, it isn´t efficient? An usual illustrator, presented by news and newspapers, of a price development of a stock market is the curve, which may have large slopes downwards every now and then, but has the basic direction upwards. Falls are often more dramatic and short-termed in the stock market than rises of the prices, which happens during a longer period. In both cases, the price of the stock in exchange and the fundamental price of a stock, counted by researcher through a sophisticated formula may deviate from eachothers.

One explanation for the stock market fluctuation is given by Stephen McClellan (2007) who claims, that a constant growth in security prices is good for banks and other intermediaries of a financial branch. He states that customers of investment advisors and banks are encouraged to make investment decisions for a short period of time, even if it is proofed, that investments should be done for a longer periods. Banks, advisors and other intermediaries of the branch, get their income of trading fees and commisions. Thus their analyses are not even meant to predict the development of returns but to motivate people to trade actively. The quality of analyses for the investors is not good. Like the title of the work says, the proposed trading strategy is momentum strategy: the right

way to act in the financial market is to do like the market does and its most powerful actors do: sell if they are selling and buy when they are buying. Today there are registers where the ownership of the companies can be checked.

Even if there are a advanced technical capabilities to trade stocks nowadays, people behind the technique implement the headlines for investment decisions. The behavior of a man has been studied for a long. It has been found that the financial-decision making is often based on biased and systematic false manners. People tend to keep losing investments too long and selling winning investments too soon. Decisions are made by heuristic methods, which are rather pleasant than optimal. Decision makers have too much confidence on their ability to find out the best solutions in the stock market. The positive information received from the advisors, who seldom tell investor to sell, leads eventually to the herd behavior where prices potentially have great deviations from their fundamental values. When there is the good sentiment in the market, the deviation is at its highest.

A bad sentiment there was in the Helsinki Stock Exchange in September 1992, when the index of the exchange landed in 541 points, the all time –low quote. The other extreme there were in March 2000, when it ended to 18277 points. Difference between these all time-high and all time-low closings are over 3300 percent. Could this happen again? The reason for this is actually the development of a single company in narrow market in Finland, and of course, the comparison is done between two extreme notions, but could the momemtum lead the stock market to the situation, where the (OM)HEX-index would be 33-times more than today? It is easy to imagine, that the stock prices can be noted sky high, there are examples of the phenomenon in the near history: bubble around the year 2000 will not be forgotten and new bubbles are to be blown, in some scale at least. More difficult it is to see, that companies could develop their actions so in the future, that their profitability of a production would be 33-times more than today, in the competed market. The thing remains to be seen, in the short-term people the things are overestimated, but in the long-term underestimated.

The empirical part of this study shows, that the price behavior of stocks of the Helsinki Stock Exchange has been relatively moderate during the last six years. There exists movements of over ± 10 percent in average 3 – 4 times per month,

but if there have been years, where the occasions have been multiple. Constituting a trading strategy based on the contrarian strategy is difficult even if there would exist a short-term overreactin in the Finnish stock market.

In the concept of market efficiency the question and the interest isn´t the intrical and fundamental value of a stock. The general agreement of the correct prices of stocks among buyers and sellers is the implications for the market efficiency. This kind of concensus is formed daily between participants of market: one wouldn´t buy the stock if he thinks it is overvalued and the other wouldn´t sell if he thinks the stock is undervalued.

The style of a trading strategy, based on the findings presented in this thesis, would be a one where the object of purchase, stock, is selected by means of a fundamental analysis and the time of purchase is selected by means of behavioral finance and technical analysis.

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