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THE POST-EARNINGS ANNOUNCEMENT DRIFT: DOES IT STILL EXIST IN THE FINNISH STOCK MARKET

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ABSTRACT:

The main purpose of this thesis is to investigate whether the post-earnings announcement drift exists in the Finnish stock market. Additionally, this thesis seeks to find out do illiquid stocks experience a greater post-earnings announcement drift than liquid stocks. Previous studies focusing on the Finnish market have only discovered a negative drift following a negative earnings announcement.

Post-earnings announcement drift is one of the oldest and persisting anomalies in the world and it was introduced by Ball & Brown (1968). The post-earnings announcement drift is the tendency for stock prices to drift toward the direction of the earnings surprise for many days. This study conducts an event study to investigate two event windows of [-5,1] and [-1,5] days and see if abnormal returns occur around the interim reports. The data of this thesis includes 41 companies that were listed on the Helsinki stock exchange during the sample period of 2010Q2 to 2017Q2.

The results show that there is a positive drift that lasts from three days before the announcement day to two days after that. On the contrary to earlier studies, the negative drift seems to dissipate after the announcement day. Illiquid stocks were found to exhibit a positive drift that was greater in magnitude than in liquid stocks for -2 to +1 days around the event day, while negative drift for illiquid stocks was only greater after the announcement day.

KEYWORDS: Post-Earnings Announcement Drift, Anomaly, Efficient markets

1. INTRODUCTION

The post-earnings announcement drift (PEAD), which is one of the longest and persisting anomalies in the world was first discovered 50 years ago by Ball and Brown (1968). It was later declared as granddaddy of all anomalies by Fama (1998). Over the past 50 years the PEAD anomaly has puzzled the academics alike and it has been studied extensively with different stock markets, time periods and models, but none has been able to fully explain it (Bernard & Thomas 1989, 1990; Liu, Strong & Xu 2003; Forner & Sanabria (2010).

The PEAD is the tendency for stock prices to drift toward the direction of the earnings surprise for many days. This indicates that the investors on the markets underreact to this new information, which causes the prices to drift slowly and not reflect the real values of the stocks. (Kothari 2001.) The PEAD anomaly is a clear violation towards the semi-strong form of efficient market hypothesis (EMH) proposed by Fama (1970) as earnings announcements are public information. Thus, the occurrence of the PEAD implies that the markets only fulfil the weak form of the EMH.

The main interest of this thesis is to test the efficiency of the Finnish stock market and see whether the PEAD anomaly exists there. Earlier studies by Kallunki (1996), Booth, Kallunki & Martikainen (1996, 1997), Vieru, Perttunen & Schadewitz (2005) and Booth, Kallunki, Sahlström & Tyynelä (2011) have only found a negative drift following negative announcements. Kallunki (1996) argued that the negative drift could be caused by the shorting-restrictions in Finland during early 90s. It is, therefore, interesting to see whether these earlier results still hold for the Finnish stock market using the more recent data.

The longevity of the PEAD anomaly makes it a very interesting research subject as most of the anomalies have disappeared from the markets after their initial finding as investors have learned to exploit them. However, this has not been the case for the PEAD anomaly.

1.1. Purpose of the study

The purpose of this thesis is to find whether the PEAD exists in the Finnish stock market during the sample period of 2010Q2-2017Q2. Earlier study by Kallunki (1996) only found a significant drift following the negative announcement news and noted that this could be due to short-selling restriction in Finland during early 90s. Although, there was a significant positive drift before the announcement was made, it disappeared on the day of the announcement. It is also interesting to see whether the abolishment of short-selling restriction has mitigated the negative drift and if a positive drift occurs in the sample period used. The flow of information has also evolved much in recent years and reaches wider audience than for example in the early 1990s. Therefore, it will be interesting to see if advancements in technology have any effect on the post-earnings announcement drift. If the PEAD exists during the sample period used in this thesis one additional "research question" is also examined, which is does the illiquid stocks experience a greater drift in magnitude than liquid stocks.

Knowing whether the PEAD still exists in the Finnish stock market can help investors react to earnings announcement and seek possible abnormal returns. However, whether investor can obtain abnormal returns from following a PEAD strategy depends on the trading costs and taxes as well.

1.2. Research Hypotheses

The following two hypotheses and the null hypothesis can be drawn from the purpose of this thesis, which are the following:

H0: The post-earnings announcement drift does not exist in the Finnish stock market.

H1: The post-earnings announcement drift exists in the Finnish stock market.

If the H1 is accepted we will draw one additional hypothesis to this thesis, which is the following one:

As Chordia, Goyal, Sadka & Shivakumar (2009) find that most of the abnormal returns are obtained from illiquid stocks, it will be tested whether this holds true for the Finnish stock market. Therefore, the second hypothesis for this thesis is the following:

H2: The magnitude of the post-earnings announcement drift is greater in illiquid stocks versus liquid stocks.

1.3. Structure of the thesis

This thesis consists of eight chapters and they are as follows. First chapter is the introduction chapter which includes the main motivation for the thesis and the research questions. In chapter two efficient markets will be introduced along with few anomalies and the concept of behavioural finance. Next, the third chapter various asset pricing models will be discussed and introduced in more detail.

Chapter four includes previous studies about post-earnings announcement drift and various different markets will be examined thoroughly. In chapter five data of the study will be presented and the methodology used in this thesis is explained in chapter 6. After that, chapter seven contains all the results of this study and their interpretation. Finally, in chapter 8 final remarks about the research questions are discussed and concluded. In the appendices section at the end, the table of the companies used in this study can be found.

2. EFFICIENT MARKETS & ASSET PRICING MODELS

2.1. The efficient market hypothesis

The efficient market hypothesis was first introduced by Fama (1970), which states that the main role of capital markets is capital allocation in the most efficient way. In order for this to come true the prices of securities must always signal correct information for the potential buyers and all available information must be reflected to the prices of securities at all times. A market which has all available information “fully reflected” to prices of securities can be considered “efficient”. If stock prices are at fair levels, they should only increase or decrease when new information is released, and this information should not be predictable. Therefore, when stocks change in light of new information, then these changes in stock prices must also be unpredictable. This is the main argument of the “random walk”, which means that stock prices move at random, and information considering these stocks is unpredictable. In these efficient markets all securities are priced correctly according to the information available and achieving abnormal returns is an unfeasible task. (Fama 1970; Bodie, Kane & Marcus 2014: 350.)

According to Fama (1970) three sufficient conditions for capital market efficiency are 1) there are no transactions costs for trading securities, 2) all information is freely available to all market participants and 3) all market participants are rational and use the available new and current information accordingly. It is easy to see that these conditions are not met in real life markets. This does not mean that missing some of these assumptions would result in inefficient markets as long as there are large number of market participants to adjust the prices to fully reflect all the available information. The disagreements among market participants about the information implications alone does not necessarily mean markets are inefficient, unless some market participant can use available information to obtain higher returns than others. Although transaction costs, cost of information to market participants and disagreements of information implications among market participants prevail to some extent in the real markets, they are not inevitably sources of market inefficiency, but potential sources. (Fama 1970: 387-388.)

2.2. Three forms of efficient market hypothesis

One of the most widely known theories in finance is the three forms of efficient market hypothesis, which is ascribed to Fama (1970). He defined these three forms as following:

1. Weak form: The prices of securities today reflect all the past information and it is not possible to earn abnormal returns by analysing historical data.

2. Semi-strong form: All public information is reflected to the prices of securities and the reaction to new information is swift. Therefore, no single market participant can gain any benefit from the information that is publicly available.

3. Strong form: All relevant information which may concern the price formation of securities is reflected to the prices, this includes also the private information. With strong form, earning excess returns is an unfeasible task, since there is no information that is not already reflected to the prices.

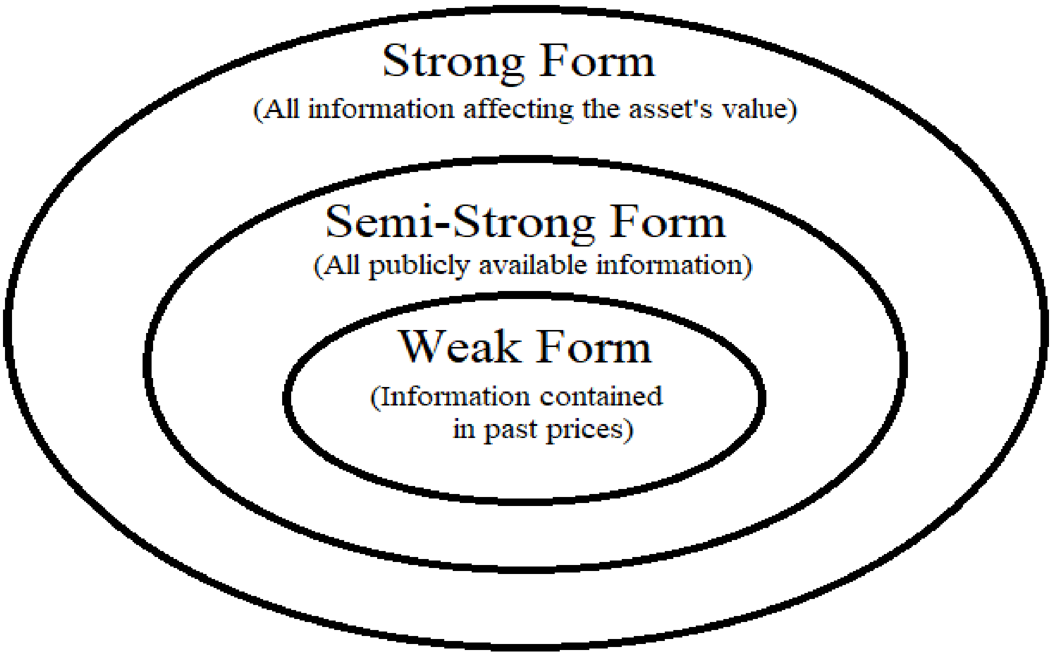

Figure 1. The three forms of efficient market hypothesis (Fama 1970).

The theory of market efficiency has had a joint problem from the days it was first introduced, and this problem emerges from trying to use a model to test the market efficiency. For varying outcomes, it is hard to proof, whether the reason is an inadequate model or inefficient markets. Jensen (1978) argues that probable reasons for failed tests of the market efficiency could be that one of these hypotheses or the joint hypothesis is false. This indicates that it is actually impossible to test the market efficiency. Fama (1991) changed his three forms of efficient markets in his paper on capital markets stating that “At the risk of damning a good thing, I change the categories in this paper.” His intention was to update the efficient market hypothesis to account for all the findings that were against it.

The new three forms of market efficiency were stated by Fama (1991) as following:

1. Tests for return predictability: Which includes the growing work of dividend yields and interest rates as forecasting returns and that market efficiency should be measured how well the returns can be predicted.

2. Event studies: As event studies have become more popular way of testing how fast the information is reflected to prices, Fama (1991) argued that event studies are good method of testing the market efficiency.

3. Tests for private information: Focuses on testing whether private information is held and used by some market participants, which is not reflected to the prices on the markets.

The old strong form of efficiency is rejected by Fama (1991), stating that new results confirm that some corporate insiders have private information which is not included in the prices on the markets. There is however a problem with measuring how well private information is used by most studied subjects of pension fund and mutual fund managers. The method of measuring how well investment managers utilize private information in their investment decisions is measured by long-term abnormal returns. Testing this, run into the problem of joint hypothesis problem mentioned earlier in this study: it is hard to say whether these abnormal returns are a result of inefficient markets, a bad model or problems with implementation of the model. (Fama 1991.)

Perfect markets is an assumption which is not accepted by many these days and seems to be an impossible condition for markets as noted by Stiglitz and Grossman (1980). They note that if markets would be perfect there would be no reason for investors to invest in costly information as all this information would already be reflected in the prices. The intention of their work was not to destroy the efficient market hypothesis but to redefine it, so that informed traders pass the costly information to the prices and therefore, all the uniformed traders would also get it. This would not lead to perfect markets but near-efficient markets. Malkiel (2003) in his paper defended the efficient market hypothesis against the attacks of recent literature that had found empirical evidence against it, such as belief that stock returns are to some degree predictable. He argued that the markets are more efficient and unpredictable than some studies have controversially claimed it to be. Efficient financial markets were defined in his study as an impossibility to earn returns above average without taking an equal amount of risk. Even though markets do not always act rationally, and prices are not always priced right, the markets still work efficiently enough and true value wins in the end. Malkiel (2003) also argued that “predictable patterns” which have been found by some studies are not robust enough to ever create opportunities which would earn profit in the long run and that after they have been published, there would be no excess returns from them as investors would zero them out with this new information.

2.3. The evidence against market efficiency: anomalies

According to the efficient market hypothesis every security should be valued at its fundamental value. Therefore, gaining greater expected excess returns than risk-adjusted opportunity cost of capital should not be possible. If the price of a security is not the same as its fundamental value an investor can sell the security at very high price and buy it at very low price. This leads to situation where an investor earns more than the cost of capital. Still there is evidence that stocks of smaller firms have outperformed stocks of larger firms and high book-to-market firms have higher returns than low book-to-market firms which is illustrated in figure 2. These findings violate the capital asset pricing model which is the most commonly used asset pricing model measuring the risk-reward ratio. These two apparent deviations from market efficiency are known as anomalies. (Brealey, Myears & Allen (2014: 208, 328.)

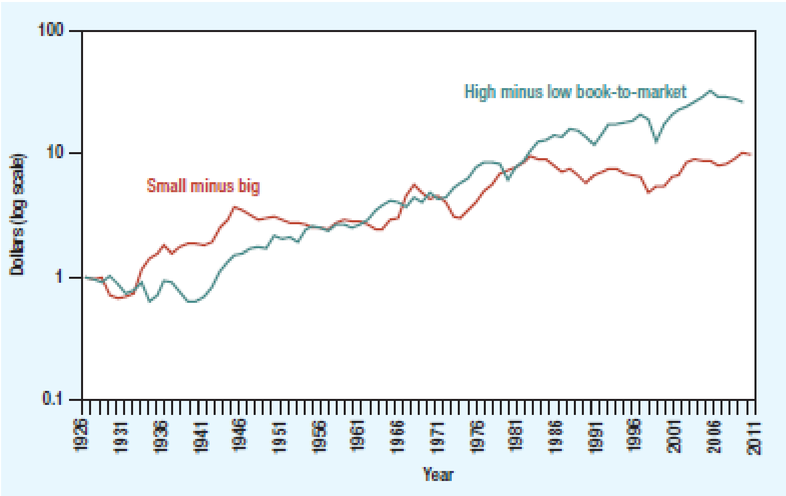

Figure 2. The returns of small minus big and high minus low book-to market 1926-2011 (Brealey et al. 2014: 203).

Possible explanations for size anomaly is that stocks of small companies are relatively more risky than those of larger companies and investors require a higher premium for investing in them. On the other hand, it could just be a coincidence coming from researchers' data mining efforts to find deviating patterns from normality. (Brealey et al. 2014: 329.) As for the value anomaly, possible explanations include that high book-to-market stocks are somewhat mispriced on the markets or that book-to-market ratio contain some risk that should be included in the risk factor (Bodie et al. 2014: 369). Fama and French (1992) found in their study that book-to-market ratio and size explained the average returns of stocks more than the beta did. This finding is interesting as the factor that should matter on the rational markets "systematic risk ", seems to be irrelevant and factors that should not matter "book-to-market" and "size", have predicting power over future earnings. Next value and size anomalies are presented in more detail and previous studies about them are discussed. The earnings-price anomaly which is the main focus of this thesis will also be presented.

2.3.1. Size anomaly

The size anomaly or the small-firm effect was first discovered by Banz (1981) as he found out that smaller firms have actually higher returns compared to risk than bigger firms. The data sample for his study came from NYSE and covered the period of 1926-1975 and included all stocks that were at least quoted for 5 years during the sample period. Results showed that there is actually a negative correlation for the whole sample period between market value of the firm and average return. Thus, stocks of small firms had higher returns on average than stocks of large firms, even though betas were equal. Figure 3 shows how the smallest firms have average mean returns that are highly unexplainable and smaller firms have an average of 0.4 percent higher returns than the rest. On the basis of his findings Banz (1981) suggests that the capital asset pricing model must be misspecified as the size anomaly appeared during the forty-year sample period in NYSE.

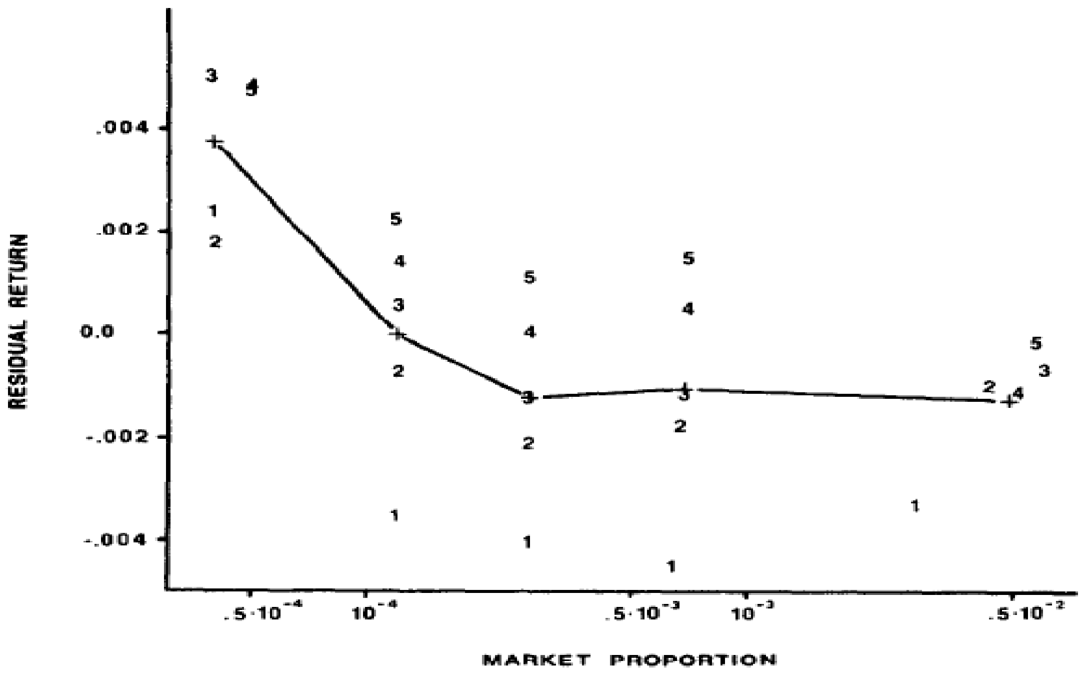

Figure 3. Mean residual returns of portfolios (1936-1975) for Banz's study (Banz 1981).

As mentioned earlier Fama and French (1992) discovered that the capital asset pricing model could not capture all the returns of the small companies and suggested that size could be a proxy for risk which the capital asset pricing model was missing. Therefore, Fama and French (1993) introduced their three-factor model that contains size as one of the factors that proxy for risk. They suggest that the size effect is not due to irrational pricing of assets.

The difference between large and small firm's structural and return characteristics were the interest of Chan and Chen (1991). They argued that smaller firms are riskier than larger firms as smaller firms tend to be marginal firms. These marginal firms have lost their market value due to bad performance on the markets, inability to produce future cash flows, high debt compared to equity and inefficient production. As marginal firms the authors meant that changes in the economy affect the prices of these firms more sensitively and they are more likely to fall during unfavourable economic conditions. The main focus of their paper was to prove that it is not the size but marginal firm characteristics which explains why smaller companies perform better than larger companies. Their evidence from their regressions were in favour of their hypothesis.

There have been some studies that have claimed the disappearance of the size effect. For example, Hirshleifer (2001) noted that the size effect disappeared during the mid-1980s. This can also be seen from figure 2, as the line clearly bends downward after 1985. Similar results were also found by Dichev (1998), who discovered that the size effect was strong during the 1960s and 1970s but has practically vanished since 1980s. However, in a more recent study van Dijk (2011) argues based on his findings that the size effect in the US markets is not actually dead. In fact, the size premiums have been quite large and positive during the recent years. He also points out that more research should be contributed towards the size effect on the US and international markets.

2.3.2. Value anomaly

Book-to-market anomaly, also known as value anomaly, was first introduced to the public by Stattman (1980). He found out that companies with high book-to-market ratios earned higher returns on average than those companies with low book-to-market ratios. Similar findings were also presented by Rosenberg, Reid & Lanstein (1985) and Chan, Hamas & Lakonishok (1991) for the US and Japanese stock markets.

One of the most cited and well-known articles focusing on the book-to-market anomaly is perhaps Fama and French's (1992) study of "The Cross Section of Expected Stock Returns". They found out that two simple measures, "size" and "book-to-market", can explain cross-sectional variation in average stock returns. They suggested that size and book-to-market are proxies for risks as smaller companies and high book-to-market companies earned on average more than their counterparts. One alternative possibility presented in their studies for the value premium of high book-to-market ratio stocks is market overreaction to possible future prospects of these companies. Fama and French (1992) concluded that their findings have practical usefulness for portfolio formation and evaluation of long-term performance.

Lakonishok, Shleifer & Vishny (1994) contributed to the value anomaly with their paper by studying data from the US markets from period of 1968 to 1990. They argue that the main reason why investing in value stocks have resulted in better returns than growth stocks is due to investors overestimating persistently the growth rate of "glamour stocks" compared to value stocks. Even though value strategies have outperformed glamour strategies, the value strategies do not appear to be riskier than glamour strategies and this is against the definition of "fundamental risk bearing" where higher returns mean higher risk. Despite value strategies being superior to glamour strategies, investors still focus more on glamour strategies and this reflects from various reasons. First, investors may take past growth rates of glamour stocks as generalized patterns, although it is highly unlikely that these will continue in the future. There is also a possibility that investors consider all well-run firms as appropriate investment choice no matter the cost. It would be easy to presume that institutional investors would be free of this judgemental bias but according to the paper institutional investors also prefer to invest in glamour stocks as they can be considered as "prudent" investments and are more easily justifiable to sponsors.

2.3.3. Earnings-price anomaly

The earnings-price anomaly, which is also known by its other name post-earnings announcement drift (PEAD), was originally discovered by Ball and Brown (1968) over five decades ago and has puzzled the academic literature ever since. PEAD is the tendency of the stocks to react slowly to the new information. This drift is predictable as the stock prices increase (decrease) when the earnings surprise is positive (negative). Implying that investors on the market underreact to this information causing the prices not to react immediately to this new information. Kothari (2001) notes, based on previous findings that the drift does not appear to be gradual but happens during three-day periods around future quarterly earnings announcements. Because most of the drift happens during one-year period, Kothari (2001) defined this drift as short-window phenomenon and concludes that the drift has both statistical and economical significance in terms of magnitude. (Kothari 2001).

Chordia & Shivakumar (2005) divided stocks based on their standardized unexpected earnings (SUE) to 10 portfolios, so that portfolio 10 represents the 10 percent of stocks with the best earnings news and portfolio 1 represents 10 percent of stocks with the worst earnings news. As can be seen from figure 4 the portfolio 10 outperforms the portfolio 1 by about 1 percent per month during the six-month period after earnings announcement is made public. The main interest of their paper was to find out whether the inflation illusion hypothesis has cross-sectional implications for the post-earnings announcement drift. This hypothesis implies that investors do not take inflation into consideration when they forecast future earnings growth rates. Moreover, stocks which are positively (negatively) correlated with inflation are considered undervalued (overvalued). They argue and were able to show that their findings are in favour of the hypothesis and that future earnings growth, abnormal returns and earnings announcement returns of SUE-sorted stocks are predictable by lagged inflation.

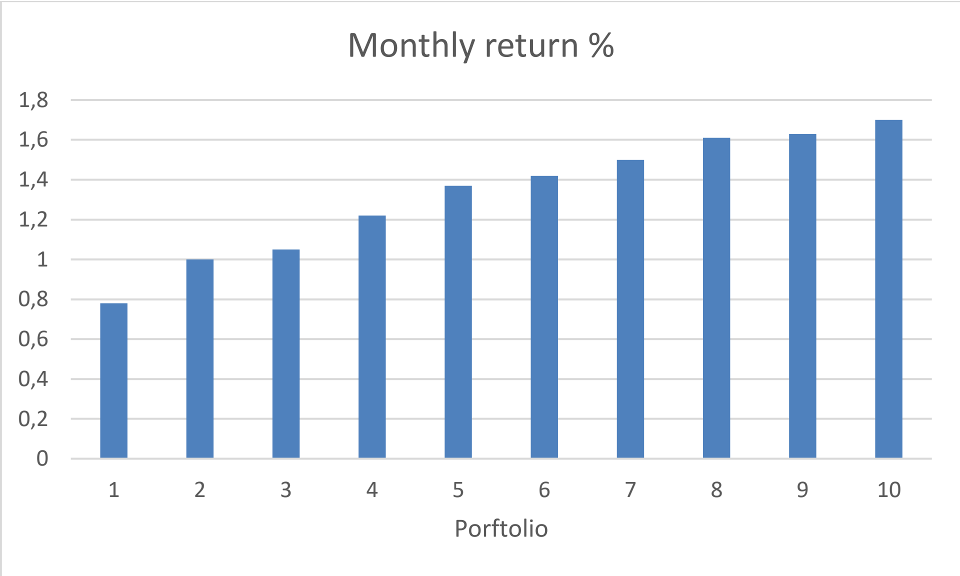

Figure 4. Monthly returns of SUE portfolios 1972-2001 (Chordia et al. 2005).

As the post-earnings announcement drift has been around for five decades, there has been extensive amount of literature contributed towards it. At the beginning most of the researchers were trying to test whether the studies were biased or not but as the methodologies improved, the focus has shifted to trying to find possible explanations for it. Next few possible causes provided by the academic literature are presented and discussed in detail.

Foster, Olsen & Shevlin (1984) suggest that possible explanation why studies have been able to show results of PEAD is the invalidity of the capital asset pricing model, the most commonly used model to measure risk-adjusted returns. Moreover, that the risk-free rate and the market premium together are not sufficient enough to measure the risk associated with returns, but some omitted risk factors are missing which could proxy the risk. This is an example of the "bad model" of joint hypothesis problem mentioned earlier in this chapter.

Francis, Lafond, Olsson & Schipper (2007) tested can the returns of the post-earnings announcement drift be explained by rational investors' reactions to information uncertainty. They used earnings quality as a measure to proxy the information uncertainty. Results revealed that markets reaction to unexpected earnings linked to higher information uncertainty is weaker and that stocks with higher information uncertainty are associated with significant abnormal returns causing the drift. Their conclusion was that these findings are consistent with rational explanations which may cause the PEAD strategies to earn abnormal returns, as investors value more precise information about future earnings.

How liquidity of the stocks affects the profitability of a PEAD strategy was the interest of Chordia, Goyal, Sadka & Shivakumar (2009). As illiquid stocks have higher trading costs than liquid stocks, it has significant implications towards PEAD strategy and its profitability. They show that the most part of the abnormal returns is concentrated on illiquid stocks and that the trading costs associated with them nullify the potential returns from a PEAD strategy. The costs arising from these illiquid stocks account for 70-100 percent of the potential profits from a PEAD exploitation strategy. Therefore, at least according to their findings, violation of efficient market hypothesis is not so flagrant. Similar findings were also found by Ng, Rusticus & Verdi (2008). Who noted that transaction costs associated with illiquid stocks lower the profits from a PEAD strategy and that transactions cost prevent informed traders from including the information about earnings into prices.

Hirshleifer, Lim & Teoh (2009) studied how information overload affects the investors' attention to earnings news which may cause the underreaction to relevant news concerning future earnings. What they found was that during announcement days, when great number of firms release their earnings news (high-news days), the price reactions to these surprises are weaker and additionally post-earnings announcement drift was stronger. The results also imply that small firms and positive earnings news are more strongly affected by the distraction of news overload than negative earnings news and large firms. Investor attention to earnings news were also the interest of DellaVigna & Pollet (2009) and they found that earnings announcements released on Friday have less instantaneous response and higher drift than the other days of the week. There is a logical explanation for this as during Friday's investors are more likely less attentive due to the upcoming weekend.

2.4. Behavioural finance

Behavioural finance is a concept that helps explain some anomalies on the markets with the irrational behaviour of investors. It has two elements which helps to do so: the limits to arbitrage, which states that arbitrageurs are not able to undo all the irrational decisions made by some investors; and psychology, which explains why some investors on the market act irrationally. (Barberis & Thaler 2003). For example, Shiller (1981) noticed that investors put too much value on the future dividends and therefore, these future dividends have too great effect on stock prices. As mentioned earlier in this chapter, possible limits to arbitrage are the transaction costs associated with the exploitation strategy. Therefore, only psychological reasons of behavioural finance will be presented.

2.4.1. Optimism and wishful thinking

People have a tendency to over exaggerate their own skills and possibilities and think that they are on average better than everybody else. This is seen in Weinstein’s (1980) study where he found that people think that they have on average better chance to experience a positive event and on average lesser chance to experience a negative event. It is easy to see how this kind of behaviour reflects to the financial markets. Investors on average exaggerate their skills and make irrational decisions.

2.4.2. Overconfidence

Overconfidence is one the psychological reasons which causes people to behave irrationally on the markets. People put too much weight on their answers and opinions to be correct when they are not. Fischoff, Slovic & Lichtenstein (1977) studied how certain people are about their answers to certain questions and asked them to evaluate on percent how sure they are. Their findings revealed that people are usually wrong about their judgement on certainty. This implies that people are not very good at assessing probabilities. This can cause investors to be overconfident to their investment decisions on the markets, which can be interpreted as irrational behaviour.

2.4.3. Representativeness

Representativeness heuristics was first introduced by psychologists Kahneman & Tversky (1974). It means that people like to think that some outcomes are more probable if they have the same characteristics of something similar that has happened. For example, if an investor has beaten the market two years in row with his portfolio, he may mistakenly think that he will likely do so in the future, even though, that is on base-rate highly unlikely. The main idea of the representativeness heuristics is that people tend to neglect the base-rates and base their opinions on small samples (the “law of small numbers”), which leads to errors in their judgement. (Hirshleifer 2001.)

2.5. Capital asset pricing model

The capital asset pricing model also, known by its abbreviation CAPM, is one the most used models in finance to determine the return of a financial asset. It does not have an unambiguous creator, but its main contributors have been William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966). They laid their work based on Harry Markovich’s modern portfolio theory, which was published in 1952. Bodie et al. (2014: 297) present the formula for CAPM as follows:

(1) $$E(R_i) = R_f + \beta_i[E(R_m) - R_f]$$

Where:

$E(R_i)$ = expected return of the asset i.

R_f = risk-free interest rate.

β_i = the beta of asset i.

$E(R_m)$ = expected return of market portfolio.

For the CAPM to be able to function there are several assumptions which it relies on. These assumptions can be considered as simplifications of real-life sophisticated world and it is quite easy to see that most of these do not even come true in real life. (Bodie et al. (2014: 302-303.) These assumptions are listed below as Bodie et al (2014: 304) presented them:

1. All investors are rational.
2. The planning period of these investors is single period.
3. Expectations of investors are homogenous.
4. There are no taxes.
5. There are no transaction costs.
6. There is no insider information.
7. Investors can lend and borrow money at risk-free rate, short selling is possible, and all assets are held publicly and trade on public exchanges.

The figure 5 below illustrates the security market line (SML), which represents the reward-risk equation. The beta represents the risk of an asset, which is its proportional part of risk it contributes to the optimal risky portfolio. The figure shows how the SML starts from the (R_f) risk-free rate and continues upward through the slope which depicts its risk premium. What can be seen from this graph, is that ($E(R_i)$) expected return of an asset (15.6) is higher than the ($E(R_m)$) expected return of the market portfolio (14) because it has higher beta, 1.2 versus 1. Not all assets are located on the SML, which means that they are not correctly priced. If an asset is above the SML it is considered undervalued and overvalued stocks lie below the SML. (Bodie et al. 2014: 298-299.)

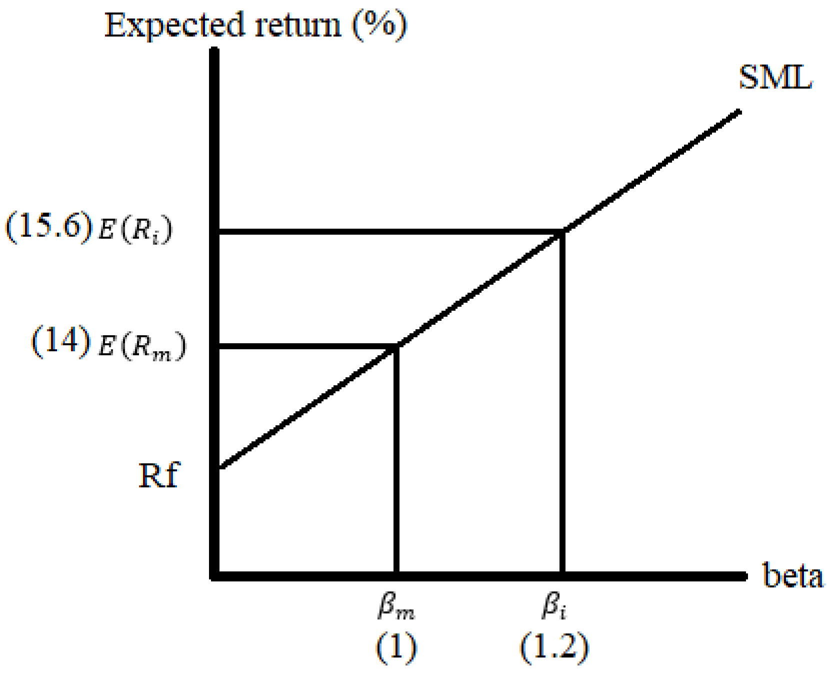

Figure 5. The security market line (Bodie et al. 2014: 299).

2.6. Arbitrage pricing theory

Arbitrage pricing theory (APT) is another theory which tries to explain the returns of assets and it was first introduced in the 1970s by Stephen Ross (1976). Like CAPM the APT also relies on assumptions to function but its assumptions are fewer. (Bodie et al. 2014: 327.) These assumptions are as following (Bodie et al. 2014: 327):

1. A factor model can depict the returns of securities.
2. There are enough securities to eliminate the unsystematic risk.
3. The security markets are efficient and do not allow persistent arbitrage opportunities.

Unlike the CAPM the APT is not interested on which portfolios are efficient, rather that each stock's return is related to macroeconomic factors which affect all stocks and “noise”, which are events that are firm-specific. The equation of APT is assumed to follow a simple relationship as shown in equation 2. (Brealey et al. 2014: 205.)

$$r - r_f = \beta_1(r_{factor1} - r_f) + \beta_2(r_{factor2} - r_f) + \cdots \quad (2)$$

Where: r = return of the asset.

r_f = risk-free rate.

β_n = the sensitivity of the stock to the factor.

$r_{factor(n)}$ = the risk premium of the factor.

The theory does not explicitly state which factors are included in the equation. The factors could be an interest-rate factor, an oil price factor for example. Factors have different sensitivity to certain stocks, for example oil price factor would have bigger impact on Exxon Mobil than, say, Coca Cola. According to APT only macroeconomic risk or factors should affect the expected risk premium of a stock and firm-specific risk should not because firm-specific risk should be eliminated with diversification. (Brealey et al 2014: 205.)

2.7. Fama and French three factor model

Fama and French developed the three-factor model as CAPM was not able explain some unusual patterns (anomalies) in the financial markets. Prior evidence had shown that, for example, size and book-to-market ratio have some explanatory power over stock returns which CAPM was unable to capture, so Fama and French included these two variables, Small Minus Big (SMB) and High Minus Low (HML) as variables in their model. They argued that these two factors could be the proxies for risk that the CAPM was missing. Smaller companies and higher book-to-market companies should earn more on average than the market because they are relatively riskier. (Fama & French 1992, 1996.) Fama and French three factor model is presented below in equation 3. (Bodie et al. 2014: 427.)

(3) $$E(r_i) - r_f = a_i + \beta_1\left[Er_M - r_f\right] + s_i E[SMB] + h_i E[HML\}$$

Where:	$\left[Er_M - r_f\right]$	= The expected market risk premium
	$E[SMB]$	= The expected size premium
	$E[HML\}$	= The expected value premium
	β_1	= Sensitivity to market risk premium factor
	s_i	= Sensitivity to size factor
	h_i	= Sensitivity to value factor
	a_i	= Active return (Portfolio actual return – Benchmark actual return)

2.8. Fama and French five factor model

Fama and French (2015) extended their three-factor model to five factor model to capture stock returns better. It includes two new factors to the otherwise same three factor model, profitability (RMW) and Investment (CWA). The profitability factor is the difference between the returns of robust and weak profitability companies, while the investment factor is the difference between high and low investment firms. Fama and French argued that their new five factor model can explain approximately 71 to 94 percent of the cross-section of variance of expected returns for the portfolios, which they examined in their paper. The five-factor model can be found below in equation 4 as Fama and French presented it in their paper.

(4) $$E(r_i) - r_f = a_i + \beta_1\left[Er_M - r_f\right] + s_i E[SMB] + h_i E[HML\} + r_i E[RMW] + c_i E[CFA]$$

Where:	$\left[Er_M - r_f\right]$	= The expected market risk premium
	$E[SMB]$	= The expected size premium
	$E[HML\}$	= The expected value premium

$E[RMW]$	= The expected profitability premium
$E[CFA]$	= The expected investment premium
β_1	= Sensitivity to market risk premium factor
s_i	= Sensitivity to size factor
h_i	= Sensitivity to value factor
r_i	= Sensitivity to profitability factor
c_i	= Sensitivity to investment factor
a_i	= Active return (Portfolio actual return – Benchmark actual return)

2.9. Dividend discount model

Dividend discount model (DDM) is one of the oldest and most basic ways to value stocks and it was invented by John Williams back in 1938. The main idea of DDM is to find the intrinsic value of the stock and it can be obtained by discounting the future dividends in order to get the present value of dividends. One important thing to realize is that with DDM we are dealing with expected values of future dividends as future is always unknown. Therefore, if future growth rate of dividends is miscalculated, it has serious consequences to the calculated intrinsic value. (Bodie et al. 2014: 595.) The formula for the dividend discount model is presented in equation 5 (Williams 1938).

(5) $$P_0 = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_t}{(1+k)^t}$$

Where:

P_0	= Present value of the stock.
D_t	= Dividend at time t.
k	= expected return of the investment

The standard version of DDM is not practical as it requires you to calculate the dividends into the indefinite future. The constant-growth model of DDM was developed by Myron J. Gordon to simplify the DDM and the model is also known as the Gordon model. The constant-growth model is simpler, so that it does not require estimates of dividends into the endless future, rather uses constant dividend growth rate in perpetuity expected for dividends as an estimate. (Bodie et al. 2014: 596-597.) Equation 6 below shows the formula for the constant-growth model (Bodie et al. 2014: 597; Gordon & Shapiro 1956):

(6) $$P_0 = \frac{D_1}{k-g}$$

Where: g = estimated constant growth rate in perpetuity for the dividends

What can be seen from the formula is that if the dividends were not expected to grow at all, the formula would just be a simple perpetuity, and then you would just divide the (D_1) dividend with the (k) expected return of the investment. It is also important to note that the model only works when the k is larger than g, otherwise the value of the stock would be indefinite. Moreover, the value of the stock is larger when the growth rate is high, expected dividends are higher, and when the expected return of the investment is lower. (Bodie et al. 2014: 596-598.)

3. LITERATURE REVIEW OF PREVIOUS STUDIES

In this chapter, previous studies of post-earnings announcement are presented and discussed. This chapter aims to provide evidence from different markets to better understand the magnitude and prevalence of the PEAD. First, the studies focusing on the Finnish market are presented and after that studies from other markets are also introduced.

3.1. Post-earnings announcement drift in the Finnish market

Kallunki (1996) studied whether the PEAD appears in the Finnish stock market during sample period of 1990-1993 by using three different models. The models employed were market information, accounting information and combination of the two. The results show that there is a significant positive drift days before the announcement is made but the drift diminishes after the announcement day. While on the contrary, the negative surprise does not cause significant drift on the days before the announcement but is highly significant during days following the announcement. This implies that there is actually a bigger delay to bad news than to good news in the Finnish stock market. It is important to realize that short-selling was prohibited in Finland during the time this paper was made. Therefore, the informed traders on the Finnish stock markets were able to use the good information in their investment decisions but because they were not able to short-sell, using the bad news for gains were an impossible task. The short-selling restriction is one factor which may unable the investors from correcting the negative drift.

Another study focusing on the Finnish stock market regarding PEAD was conducted by Booth, Kallunki & Martikainen (1996). Their data consisted of 31 firms that were listed on Helsinki stock exchange during sample period of 1989-1993 but the reaction to earnings announcement news is investigated after 1990 because new security market legislation was enacted in 1989. So, the first full calendar year it was active was 1990. The results show that the effect of PEAD is only marginal in the sample. There seems to be only negative drift during (1, 5) days period after the negative news are released and this is significant for both, lumped and uniform returns using t-statistic by Patell (1976).

However, the effect disappears for the lumped results after the method by Boehmer, Musumeci & Poulsen (1991) is used. Booth et al. (1996) similarly note like Kallunki (1996) that there is no significant drift after positive earnings news are released.

Booth, Kallunki & Martikainen (1997) made another paper focusing on the Finnish markets with focus of studying announced accounting earnings relationship to cumulative unexpected earnings. Their sample consisted of 43 Finnish firms listed on the Helsinki stock exchange during the time period of 1990-1993 but all the financial firms were excluded as they have different accounting practices. They remark that in Finland more attention to tax considerations is given by Finnish firms than in so called "economic reality", in the process of preparing financial reports. This have implications for reported earnings so that they have no power in explaining the unexpected earnings amid the post-announcement period of earnings. However, firms that make adjustment for tax purposes seem to have high unexpected earnings as these firms have high enough incomes to exploit the various ways of earnings management, for example depreciation. They also note that while the US evidence shows that the drift is stronger for positive news, in Finland this seems to be the opposite. The drift is stronger for negative news and is consistent with many previous results for other markets than US, including Finland.

Vieru, Perttunen & Schadewitz (2005) investigated how non-institutional trading activity around interim earnings announcements affects post-earnings announcement drift on the Finnish stock market during sample period of 1996-2000. Their data included all the trades made during the time period. The trading activity of non-institutional investors show no clear relation to price changes after moderate earnings announcement is made. While investor classes of intermediate and passive seem to intensify the negative drift with their excessive buying after extremely negative news are released. In the case of extremely positive earnings news trading by individual investors appears to be related to the post-earnings returns. Consistent with the findings of Kallunki (1996) Vieru et al. (2005) find that the drift happens after negative earnings announcement is made. This can be seen from table 1, which illustrates the results from their study. As the returns from [1, 10] days after extremely negative news are significantly negative.

Table 1. Mean cumulative abnormal return for five earnings surprise categories (Vieru et al. 2005).

Window	*AR RANK 0 "extremely negative"*	*AR RANK 1 "somewhat negative"*	*AR RANK 2 "neutral"*	*AR RANK 4 "somewhat positive"*	*AR RANK 5 "extremely positive"*
[-10,-1]	0.11	0.009	0.003	-0.000	-0.007
	(0.159)	(0.080)	(0.546)	(0,977)	(0.455)
[0]	-0.071	-0.021	-0.003	0.013	0.057
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
[1,10]	-0.028	-0.003	-0.002	0.003	0.002
	(0.001)	(0.595)	(0.736)	(0.703)	(0.773)

Each stock portfolio consist of 120 earnings announcements based on beta-adjusted uniform returns during the announcement period, i.e. days [0].AR Rank 0 consists of 120 events with an extremely bad earnings surprise, AR Rank 1 consists of 120 events with somewhat bad earnings surprise, AR Rank 2 consists of 120 events with no clear earnings surprise, AR Rank 3 consists of 120 events with a somewhat positive earnings surprise, and finally AR Rank 4 consists of 120 events with extremely good earnings surprise. Two-sided p-values in parentheses.

Booth, Kallunki, Sahlström & Tyynelä (2011) studied the Finnish stock markets with focus on finding who causes the post-earnings announcement drift and whether this drift occurs after scheduled earnings and unscheduled non-earnings announcements. Their method to do this was using trading data of domestic and foreign investors trading behaviour. Their results indicate that the drift happens for the both kind of announcements but only with negative news. They note that this is accordingly to the concept that negative and positive announcement news are different with their price adjustment process. Moreover, the trading patterns investigated show that foreign investors seem to be more sophisticated investors in sense that they react to the announcement news faster. The difference in foreign versus domestic investors behaviour is that the foreign investors seem to sell their stocks when negative announcement is made while on the contrary, domestic investors act in the opposite manner. The authors remark that this kind of trading behaviour suggests that foreign investors are better at processing information which supports the earlier empirical studies. The results also implicate that the pervasiveness of the post earnings announcement drift could be due to information processing skill differences among investors.

3.2. Post-earnings announcement drift in the US market

Bernard and Thomas (1989) studied the post-earnings announcement drift in the US market with focus on trying to discriminate between the two competing explanations for it, which go into two categories: prices are delayed to new information and that CAPM is incomplete, so that the abnormal returns are nothing more than mere compensation for risk, which the CAPM is unable to capture. Their study used data from NYSE/AMEX firms for the period of 1974-86 and included 84 792 firm-quarters of data. The results imply that there is an evident post-earnings announcement drift, which increases with unexpected earnings as can be seen from the figure 6. An investment strategy which was long in the highest decile of unexpected earnings and short in the lowest decile would have earned approximately abnormal returns of 4.2% over the 60 days after the earnings announcement was made public. Interestingly the effect of post-earnings announcement differs with firm size as the drift appears to be larger for smaller firms than for larger firms. The 60-day holding period returns with continuously balanced SUE strategy for small firms is 5.1% versus 2.8% for large firms. The authors concluded that their results cannot support the argument for failure to adjust for risk but are coherent with the prices are delayed to new information response.

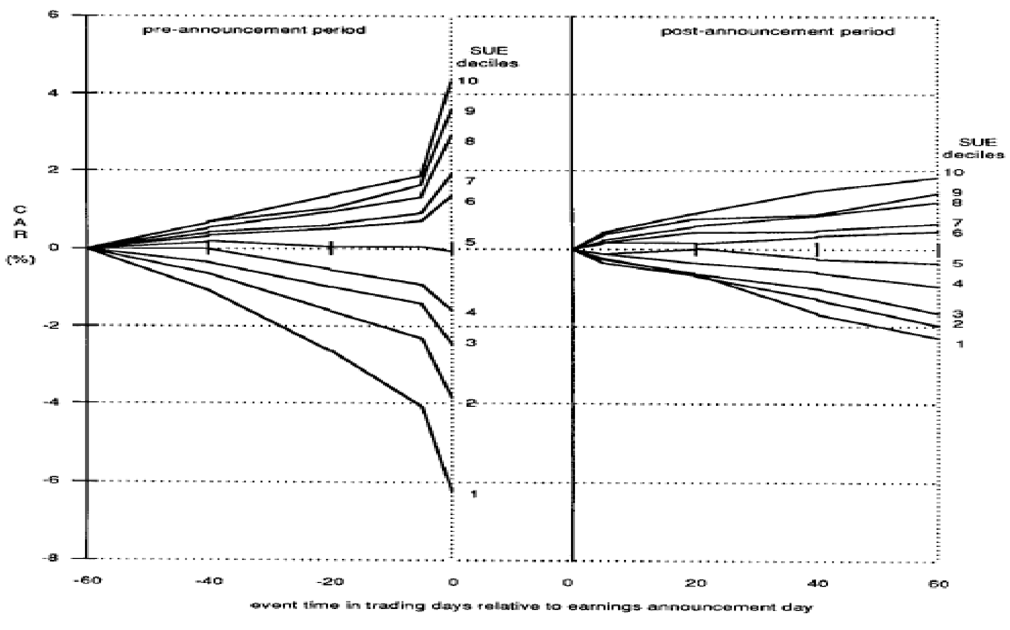

Figure 6. Cumulative abnormal returns for SUE portfolios: including all announcements (Bernard & Thomas 1989).

In a later study, Bernard and Thomas (1990) tested the hypothesis that current earnings have implications for future earnings. They found that there is actually a correlation between earnings over three quarters following the initial announcement, but the correlation turns to negative during the fourth quarter. This implies that investors underestimate the impact of current earnings to future earnings. Possible alternative explanations were also investigated such as transaction costs and risk adjustment, but neither could be proved viable.

To explain post-earnings announcement drift, Kim & Kim (2003) constructed a four-factor model from the Fama and French (1993) three-factor model by adding the risk factor of unexpected earnings (SE) to it. To examine if their new four-factor model can explain the PEAD they formed 10 SUE sorted portfolios. At first the original three-factor model and four-factor model which included momentum factor were used to see how adequately they could capture the abnormal returns from SUE sorted portfolios. Neither three-factor model nor the four-factor model with momentum factor could explain the abnormal returns as their intercepts were almost all statistically significant. However, when the four-factor model with SE factor was used only five out ten intercept had significant t-statistics and the rest 5 had also decreased remarkably. The authors concluded that their four-factor model does remarkably well in explaining the PEAD anomaly. They also argued that earlier studies which have captured the PEAD are most likely due to misspecified models.

Bird, Choi and Yeung (2014) stated that the post-earnings announcement seems to be as much alive today as it ever was, and the focus of their study was to provide a new explanation for it using the level of market uncertainty and sentiment which prevail amid the post-announcement period. They suggest that market sentiment, which can be viewed as the state of mind of investors, and the level of market uncertainty how investors interpret the information on the market, influence how the investors act upon the earnings signal during the period after the earnings are made public. It seems that during periods of high market uncertainty and low sentiment investors have difficulties in making decisions based on the earnings announcement, which leads to negative drift associated with both good and bad news. Additionally, the drift during these times is even larger for the bad news. Controversially, when the level of market uncertainty is low, and sentiment is high investors trust their decisions more and information considering earnings announcements are somewhat clearer. At these times, investors are more optimistic and positive towards the new information, which results in a positive drift after good news are released and significantly lower negative drift after bad news are made public. Moreover, growth stocks and small stocks seem to be influenced more than their counterparts, value stocks and large stocks by prevailing uncertainty and sentiment over the post-announcement period.

3.3. Post-earnings announcement drift in the other European markets

A paper by Liu, Strong and Xu (2003) investigated whether the PEAD occurs in the UK market by using earnings surprise measures based on the time-series of earnings, market prices and analysts' forecasts. Using all the measures mentioned, they found that there is an evident and significant PEAD in the UK market, which were able to survive alternative robustness checks. The evidence supports similar results for the UK noted by Bernard and Thomas (1990) that investors fail to perceive how information about future earnings are implied by current earnings and that the drift happens unevenly around the upcoming earnings announcements. The authors argue that the cause for the drift in the UK is unlikely not any of the following reason: failure to control for market risk, market value, book-to-market, or due to other effects like price, cash earnings to price, and number of analysts. As investors fail to react to a simple and public information as salient and general as earnings announcement suggests, according to the authors, a violation towards semi-strong form of market efficiency.

Whether the PEAD appears in the German equity markets was the interest of paper by Dische (2002) and it was, according to the author, the first to do so. The paper argues that stock prices' future movements can be predicted from information which cumulates from dispersion in analysts' forecast consensus. Their findings were in line with earlier research that German stock market prices underreact to earnings news and continue to move towards the direction suggested by analysts' forecasts. Also, that it takes roughly six months for the information to be fully incorporated to the prices. The results show that investment strategy that is long on positive forecast revisions and short on negative forecast revisions on the German stock market earns abnormal returns. With this finding, the author argued that other similar findings are not due to data mining, but rather successful studies in the field of PEAD research. Moreover, the findings imply that stocks with low dispersion in analysts’ forecasts earn higher abnormal returns than stocks with high dispersion in analysts’ forecasts. The difference in abnormal returns of strategies of these two for 6 month holding period that is long on positive revisions and short on negative revisions earns 1.74 percent per month for low dispersion versus 0.80 percent per month for high dispersion. Finally, the paper concluded that this result is not explainable by standard asset pricing model and it implies a semi-strong market inefficiency.

3.4. Post-earnings announcement drift in the Asian markets

Earnings surprise strategy and its profitability in the Chinese stock market during post-earnings announcement period was examined by Truong (2011). The evidence shows that PEAD anomaly also appears in Chinese stock market and this is true, whether the earnings surprises are defined as analyst forecast consensus or time-series forecast model. A trading strategy similar to many other studies, which is long on the top quantile (the highest surprise stocks) and short on the bottom quantile (the lowest surprise stocks) yields a return of 9 percent in the one-year period after the earnings announcements are released. The magnitude of the drift is found to be positively correlated with a stock’s idiosyncratic risk and negatively correlated with foreign ownership. These findings are according to the notions that high idiosyncratic risk hinder the arbitrage opportunities which arise from mispricing and that foreign investors are more efficient in responding to the new essential information than the domestic Chinese ones. The paper found similar results as Kallunki (1996) for Finnish market that the negative drift is more prominent than the positive one and is most likely due to the Chinese short-selling restrictions, which applied to Finnish markets in the early 90s as well.

4. DATA & METHODOLOGY

The sample used in this thesis includes 41 Finnish companies listed on the Helsinki Stock Exchange during sample period of 2010Q2 to 2017Q2 and 1189 quarterly earnings observations from same period. 41 companies were picked because they were the only ones for which the whole data needed to conduct this thesis was available from I/B/E/S database. Companies which had two set of stock classes, the one which is more frequently traded was chosen. The standardized earnings surprise was calculated by extracting mean analyst estimate from actual EPS and then dividing the result with the standard deviation of mean analyst estimate. If the earnings surprise is positive then the earnings surprise is assigned as positive rank, if negative the other way around, and if the difference is zero then it is ranked as neutral. The historical daily stock prices of 41 used companies in this thesis were also acquired from I/B/E/S data base and cover the time period of 31.12.2009 to 29.12.2017. As market index the OMXH 25 index is used and it covers the same period as the historical stock prices. The quarterly earnings announcement dates were obtained also from I/B/E/S data base.

The development of the market index OMXH25 during the sample period can be seen from the figure 7 shown below. What can be seen from the figure is that the OMXH25 have quite steadily grown since the end of 2009 to the end 2017, although, it has included some drops during the sample period.

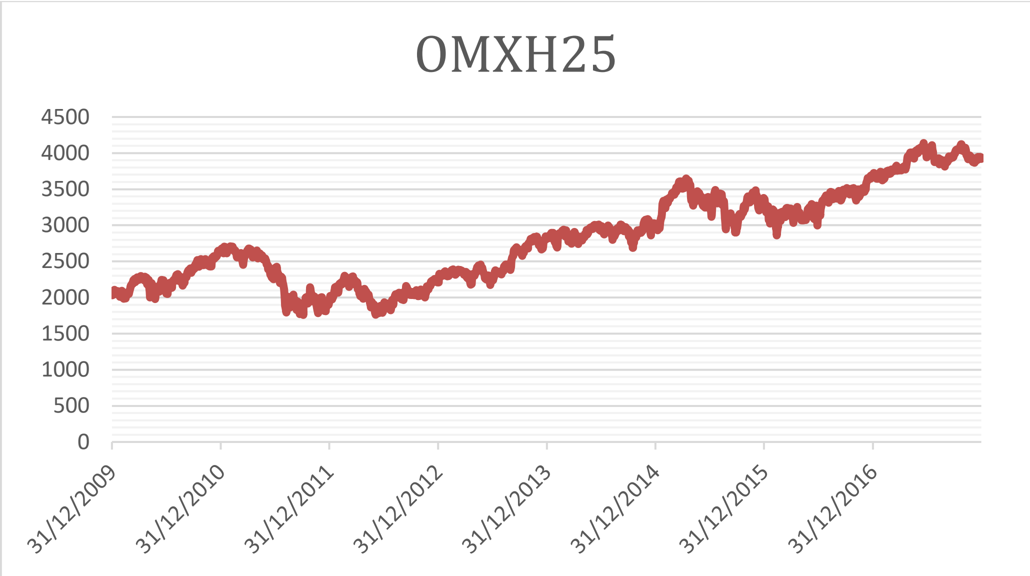

Figure 7. The development of OMXH25 index.

4.1. Earnings surprise

This thesis uses the analyst forecast method as an earnings surprise following the prior work of Kaestner (2006). The standardized unexpected earnings (SUE) are described as actual earnings per share minus consensus analyst forecast estimate divided by the standard deviation of the consensus analyst estimate. If the standard deviation of analyst forecast is zero, then it is changed to $0,01, as done similarly by Medenhall (2004) in his study. The formula for SUE is shown below as Kaestner (2006) it presented:

(7) $$SUE_q = \frac{EPS_q - EST_q}{\sigma EST_q}$$

Where: EPS_q is the actual EPS reported by the company during quarter q.

EST_q is the consensus analyst estimate.

σEST_q is the standard deviation of consensus analyst estimate.

When there is a large disagreement among analysts for the earnings forecasts, the standard deviation in the model is higher. The SUE measure in this model is low in case of high uncertainty, which means, that the consensus among analysts is low. On the other hand, during high consensus among analysts, the consensus standard deviation will be lower and there will be greater surprise for any value of unexpected earnings. There are many other models to calculate the SUE measure, but this was chosen because it takes the deviation in analysts' forecasts into account.

4.2. Event study

The empirical part of this thesis is conducted by using the event study methodology which was introduced by Fama, Fisher, Jensen & Roll (1969). The idea of event study is to study the effect of actions and events on prices of securities. The event study studies these effects and actions by defining an estimation window which measures stock's normal behaviour and investigates how it behaves around the set event window. In this thesis two event windows are investigated which are [-5,1] and [-1,5]. These event windows aim to find out how the release of the quarterly reports influence the stock prices around the interim reports and whether the PEAD exists in the Finnish stock markets during sample period of 2010-2017. The figure below shows the basic timeline of the event study.

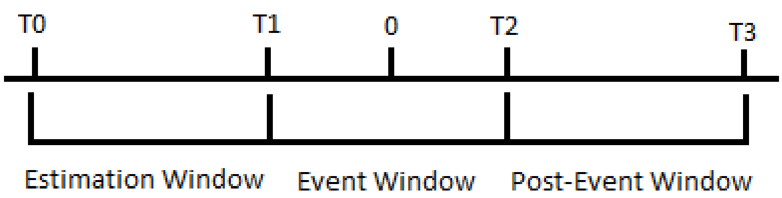

Figure 8. The event study timeline.

In the figure 8, the line between the T0 and T1 is depicted as estimation window which is set by the researcher to find the time period which best suits the normal behaviour of the stock investigated, to compare it to the abnormal behaviour of stock to find the possible abnormal returns. The event window is located between the T1 and T2, and the 0 marks the actual event date when event occurs that might affect the stock's normal behaviour. In an event study the abnormal returns are obtained by comparing the predicted returns from the estimation window to the returns cumulating from the event window. The post-event window, which is located in between the T2 and T3 is used in long-term event studies where the stock behaviour is studied from a longer period. Kothari (2001) argues, that using post-event window in event studies can lead to erroneous inferences about the obtained results, as according to him, it is hard to determine whether the abnormal returns from that time period can be traced back to the event happening at time 0 or if they are caused by some other events.

4.3. Measurement of abnormal returns

The important measurements needed in the event studies are the abnormal returns which are calculated by comparing the expected returns to actual returns. This thesis follows the traditional event study methodology proposed by Fama et al. (1969) which aims at obtaining the cumulative average abnormal returns (CAAR). The process of calculating the CAAR is divided into three steps, which are (1) calculating the daily abnormal returns, (2) calculating the average abnormal returns (AAR) and (3) summing the average abnormal returns over the T days in the event window to obtain the CAAR values. The formula for basic mean adjusted returns is shown in equation 8 as Strong (1992) it presented:

(8) $$AR_{it} = R_{it} - E(R_{it})$$

Where: AR_{it} is the abnormal return.

R_{it} is the actual return.

$E(R_{it})$ is the expected return estimated from the estimation window.

The basic mean adjusted returns model is very simple and it does not take market wide movements into consideration. Therefore, the market adjusted returns is the model which is most usually used in studies that use event studies as a methodology. In a market returns model the interest is the difference of security return used in the sample and equivalent return of the market index (Brown & Warner: 1980). The formula for the market model is presented in equation 9 below (Strong 1992):

(9) $$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

Where: AR_{it} is the abnormal return.
R_{it} is the period t return for asset i.
R_{mt} is the period t return for the market index.
β_i is the sensitivity of asset i to the market return.
α_i is the excess return of the asset i compared to market index.

In this thesis the market model shown above is utilized to capture the daily abnormal returns of the companies used in this study. When daily abnormal returns are calculated, the average abnormal returns can be obtained. The (AAR) for a period is the mean of the daily abnormal returns (MacKinlay 1997):

(10) $$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it}$$

When the AARs are obtained for the event window, it is possible to calculate the respective CAAR by summing all the AARs in the event window. The formula for calculating the CAAR is shown below in equation 11 (MacKinlay 1997):

(11) $$CAAR_t = \frac{1}{N}\sum_{i=1}^{T} AAR_t$$

This thesis uses AARs and CAARs to measure abnormal returns because they are meant to test the significance of a sample of events, while AR and CAR are test measures for individual events. The CAAR measure is a useful measure in statistical analysis as it allows to see the whole effect of the abnormal returns. Specifically, when the event itself not only influences the returns of the event date but the returns around the event date also.

Next the tests used in this thesis to test the significance of the abnormal returns are introduced.

4.4. Significance tests

To test the hypotheses of this study, test statistics are needed. There are several test statistics that can be used to test whether abnormal returns are zero or not. The most common way is to use the basic t-test:

$$t = \frac{\bar{X}-\mu_0}{s(\sqrt{n})} \tag{12}$$

Where: $\bar{X}$ = the sample mean

μ_0 = the test value

s = the sample standard deviation

n = size of the sample

However, t-test is more suitable for small samples and when population variance is unknown. Therefore, z-test is more suited for the data in this study. Moreover, significance tests are grouped into two categories which are parametric and nonparametric tests. The difference between these two is that parametric tests assume that abnormal returns are normally distributed while nonparametric tests do not. Schipper and Smith (1983) note that the strengths of nonparametric tests lies with their ability to exclude outlier-effects, while parametric tests may reject the null hypothesis due to few outliers. This thesis uses Patell z test (Patell 1976) as a parametric test and Corrado rank test (Corrado & Zivney 1992) as a nonparametric test. The equation for Patell z test is shown below (Patell 1976):

$$Z_{Patell} = \sqrt{\frac{n*(L_1-4)}{L_1-2}}\,\overline{SCAR_t} \tag{13}$$

Where: L_1 = is the length of the estimation period

$\overline{SCAR_t}$ = is the average standardized CAR in equation.

Kolari & Pynnönen (2010) proposed a modification for the Patell-test that takes the cross-correlation of the abnormal returns into account. As the Patell (1976) test considers this cross-correlation to be zero it sometimes rejects the null hypothesis too easily. The adjusted Patell z statistics is therefore used in this study:

(14) $$Z_{Patell} = Z_{Patell}\sqrt{\frac{1}{1+(N-1)\bar{r}}}$$

Where: $\bar{r}$ = is the average of the sample cross-correlation of the estimation period abnormal returns.

What can been seen from the formula is that when the correlation is zero, the adjusted Patell z statistic becomes the original Patell test statistic.

The next significance test used in this study, which is a nonparametric test, is the Corrado rank test and its formula is as follows (Corrado & Zivney 1992):

(15) $$t_{rank,t} = \frac{\overline{K}_t - 0{,}5}{S_{\overline{K}}}$$

Where: $\overline{K}_t$ = is the average of the assigned ranks to the abnormal returns.

$S_{\overline{K}}$ = is the standard deviation of the assigned ranks to the abnormal returns.

Corrado rank test statistic was meant for testing single day event abnormal returns. Kolari and Pynnönen (2011) introduced generalized rank test (GRANK) which can test both, single day and cumulative abnormal returns. The GRANK statistic is used in this thesis and the equation for it is provided in below:

(16) $$Z_{Grank} = \frac{\overline{K_0}}{S_{\overline{K_0}}} = \sqrt{\frac{12N(L_1+2)}{L_1}}\,\overline{K_0}$$

Where: $\overline{K_0}$ = Mean rank across firms and time in the event window.

$S_{\overline{K_0}}$ = Standard deviation for the rank.

L_1 = The length of estimation period.

N = The number of non-missing returns across firms.

5. EMPIRICAL RESULTS

In this chapter the results from the event study conducted are presented and discussed. The goal is to determine whether the post-earnings announcement drift still occurs in the Finnish market during the sample period of 2010Q2-2017Q2 and to investigate if the illiquid stocks experience a greater PEAD than liquid stocks.

5.1. Results for the full sample

The results for the full sample, which consists of 1189 observations from which 437 were ranked as positive news, 45 were ranked as neutral news and 707 were ranked as negative news, are presented in table 2. The results for the positive news imply that there is a positive drift which starts 3 days before the announcement is made and continues to the day after the announcement is released. The AAR for event day is 1,4 % and its adjusted Patell Z statistic is 19,3422, which is highly significant with 1% level.

Neutral news seems to generate statistically significant AARs on the day before the announcement day and on the announcement day. The AAR is positive the day before the announcement but the AAR on the announcement day is negative. This implies that there is not any kind of drift happening, as the increase on the day before the announcement could be investors buying the stocks due to speculation, and the negative returns on the announcement day is most likely a correction by the market.

Interestingly negative news seems to generate statistically significant AARs from two days before the announcement until the announcement day, but the AAR on the day after the announcement is insignificant, implying that the information is incorporated to the prices on that day. This finding is opposite to what the earlier studies, e.g. Kallunki (1996) and Booth et. al. (1996) have found out from the Finnish market, where negative news has been the only news inducing a drift that continues after the announcement day.

Table 2. AAR, CAAR and significance results for the full sample in (-5,1) days around the event date.

T	AAR	ADJ. Patel Z	Grank Z	CAAR
	POSITIVE ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	-0,05 %	-0,9075	-0,8659	-0,05 %
-4	-0,07 %	-0,4765	-0,9555	-0,12 %
-3	0,18 %	2,7107***	1,8378	0,06 %
-2	0,16 %	2,2726**	2,3753**	0,22 %
-1	0,17 %	2,305**	2,3484**	0,39 %
0	1,4 %	19,3422***	6,6585***	1,79 %
1	0,3 %	4,4118***	2,3409**	2,09 %
N	437	437	437	437
	CAAR (-5,1)	11,32***	8,0963***	
	NEUTRAL ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	0,39 %	1,9617	1,1771	0,39 %
-4	-0,002 %	-0,2149	0,3489	0,388 %
-3	0,35 %	1,705	0,7816	0,738 %
-2	-0,06 %	-0,0228	-0,2047	0,678 %
-1	0,79 %	3,5839***	2,717***	1,468 %
0	-0,37 %	-2,347**	-0,9444	1,098 %
1	0,14 %	0,8588	0,1907	1,238 %
N	45	45	45	45
	CAAR (-5,1)	2,027**	1,9726**	
	NEGATIVE ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	-0,08 %	-1,258	-0,1502	-0,08 %
-4	0,03 %	0,9242	1,7336	-0,05 %
-3	-0,02 %	-0,2822	-0,3615	-0,07 %
-2	-0,11 %	-2,0932**	-1,8222	-0,18 %
-1	0,07 %	2,1749**	2,189**	-0,11 %
0	-1,25 %	-23,5966***	-7,3829***	-1,36 %
1	-0,01 %	-0,6525	-0,1256	-1,37 %
N	707	707	707	707
	CAAR (-5,1)	-8,1462***	-5,6399***	

*** and ** indicate 1 % and 5 % significance levels respectively.

The figure 9 illustrates the CAARs for the good, neutral and negative news for the full sample around the event window (-5,1) days. The positive drift can be seen from the figure as the CAARs start to increase upwards three days before the announcement is made and experiences a steep hike one day before the announcement. After the announcement is made the positive drift continues to increase, but not with the same magnitude. Neutral news experiences an upward hike on the day before the announcement but then undergoes the correction move by the market. For the negative news the drift appears to start on the announcement day as it experiences a deep fall after the negative news are released but it then stabilizes on the day after the announcement day.

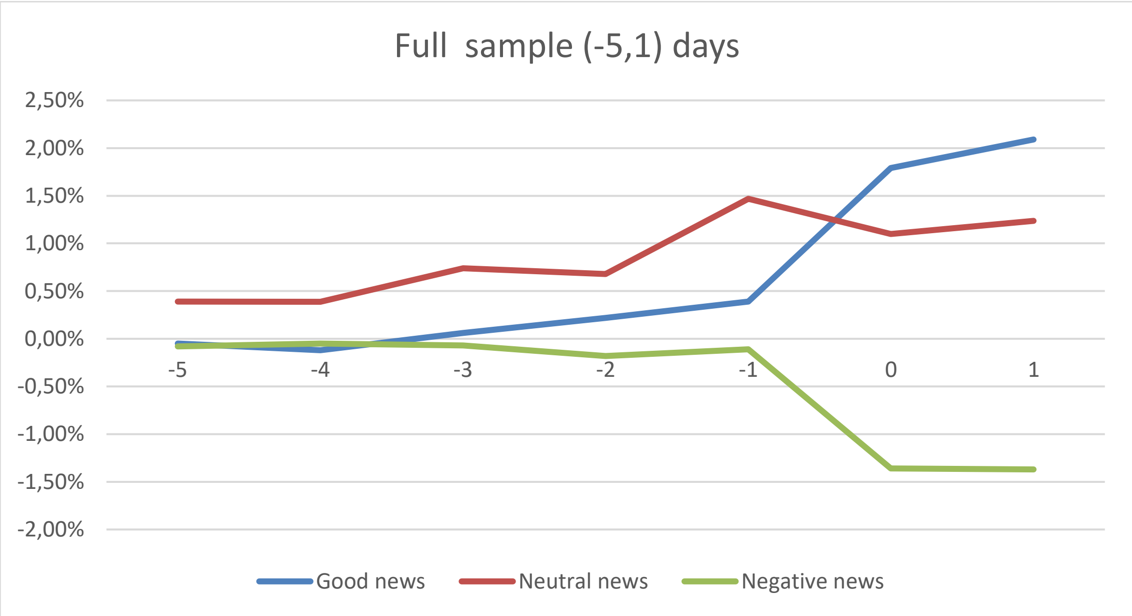

Figure 9. The CAARs for the full sample in (-5,1) days around the event day.

Table 3 provides the results for the event window (-1,5) days around the event day. It can be seen from the table that the positive drift continues for two days after the announcement is released and then starts to follow more of a random walk movement. The event window (-1,5) days do not bring any more insights to neutral and negative news as their drifts did not continue after the announcement day. However, both neutral and negative news had significant AAR on the fifth day after the announcement was made. This is arguably due to other events on the market which have caused these significant negative drops.

Table 3. AAR, CAAR and significance results for the full sample in (-1,5) days around the event date.

	POSITIVE ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,17 %	2,3357**	2,435**	0,17 %
0	1,4 %	19,2887***	6,5988***	1,57 %
1	0,3 %	4,3413***	2,3081**	1,87 %
2	0,19 %	3,5073***	2,4111**	2,06 %
3	-0,02 %	-0,0103	-0,0239	2,04 %
4	0,08 %	1,3547	1,6542	2,12 %
5	-0,01 %	0,0331	-0,1762	2,11 %
N	437	437	437	437
	CAAR (-1,5)	11,1594***	7,5349***	
	NEUTRAL ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,79 %	3,53***	2,7449***	0,79 %
0	-0,39 %	-2,2566**	-0,9444	0,40 %
1	0,13 %	0,8259	0,121	0,53 %
2	-0,16 %	-1,36	-1,0933	0,37 %
3	-0,07 %	-0,6376	-0,8374	0,30 %
4	-0,02 %	0,062	0,1768	0,28 %
5	-0,33	-2,1587**	-2,1494**	-0,05 %
N	45	45	45	45
	CAAR (-1,5)	-0,7338	-0,1442	
	NEGATIVE ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,07 %	2,1687**	2,1996**	0,07 %
0	-1,25 %	-23,6969***	-7,4381***	-1,18 %
1	-0,02 %	-0,7445	-0,1802	-1,20 %
2	-0,07 %	-1,6689	-1,9273	-1,27 %
3	-0,01 %	-0,3035	-0,6925	-1,28 %
4	-0,04 %	-0,7321	-1,2242	-1,32 %
5	-0,04 %	-1,2849	-2,611***	-1,36 %
N	707	707	707	707
	CAAR (-1,5)	-8,5733***	-6,323***	
	*** and ** indicate 1 % and 5 % significance levels respectively.			

The behaviour of CAARs for good, neutral and negative news for the full sample can be seen from the figure 10. As mentioned above in Table 3 results, the positive drift seems to continue for two days after the announcement is made public and after that stabilizes. Neutral and negative news do not experience any drift after the announcement day.

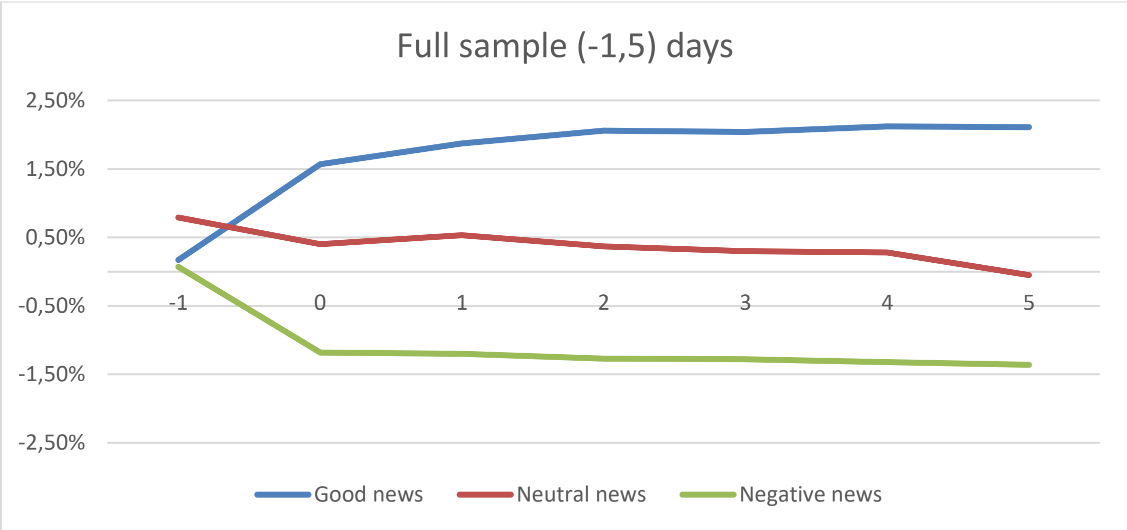

Figure 10. The CAARs for the full sample in (-1,5) days around the event day.

5.2. Results for the liquid and illiquid stocks

In the next part the hypothesis two will be tested, which was whether illiquid stock experience a more greater drift than liquid stocks. The companies in the sample are divided based on their average stock volume from the whole sample period into liquid and illiquid stocks. This classification resulted in 22 liquid stocks and 19 illiquid stocks. Table 4 on the next page presents the results for liquid stocks in (-5,1) days around the event date. Positive news in liquid stocks does not seem to generate as long drift as experienced in full sample, as the drift seems to start on the day of the announcement. As for the neutral news, it resembles the results from the full sample, but the correction move on the announcement day is more negative and the abnormal returns on 3 days prior to event day are significant unlike in the full sample, which could be just due to other events on the market. Negative news generates a significant AAR only on 4 days prior to event day and on the event day. Just like in the full sample, the negative drift disappears on the day after the announcement day

Table 4. AAR, CAAR and significance results for the liquid stocks in (-5,1) days around the event date.

	POSITIVE ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	-0,05 %	-0,7449	-0,6743	-0,05 %
-4	-0,21 %	0,1485	-0,2912	-0,26 %
-3	0,19 %	2,2217**	1,3505	-0,07 %
-2	0,08 %	0,9766	1,2919	0,01 %
-1	-0,01 %	-0,3319	0,2384	0,00 %
0	0,83 %	9,5276***	3,1036***	0,83 %
1	0,17 %	2,0239**	1,157	1,00 %
N	255	255	255	255
	CAAR (-5,1)	5,7241***	3,86***	
	NEUTRAL ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	0,31 %	1,7233	1,1568	0,31 %
-4	-0,23 %	-1,0915	-0,2081	0,08 %
-3	0,52 %	1,9957**	1,1078	0,60 %
-2	-0,2 %	-0,524	-0,3183	0,40 %
-1	0,78 %	2,764***	2,1973**	1,18 %
0	-0,85 %	-4,0474***	-1,6771	0,33 %
1	-0,01 %	0,0273	-0,1714	0,32 %
N	26	26	26	26
	CAAR (-5,1)	0,3212	0,557	
	NEGATIVE ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	-0,02 %	-0,0453	1,0439	-0,02 %
-4	0,17 %	2,1615**	2,2927**	0,15 %
-3	-0,11 %	-1,6742	-1,295	0,04 %
-2	-0,12 %	-1,4684	-1,1934	-0,08 %
-1	-0,03 %	0,9108	0,996	-0,11 %
0	-1,31 %	-17,9585***	-4,9735***	-1,42 %
1	0,01 %	-0,3094	0,1255	-1,41 %
N	707	707	707	707
	CAAR (-5,1)	-7,8722***	-3,5744***	
	*** and ** indicate 1 % and 5 % significance levels respectively.			

Figure 11 depicts how the CAARs for good, neutral and negative news behave during the event window of (-5,1) days for the liquid stocks. As can be seen, negative news only experiences a negative drift on the announcement day, which diminishes on the next day. Positive drift generated by positive news starts on the announcement day but continues to drift upward similarly as in the full sample. Neutral news experiences quite similar movement as it did in the full sample, although it is more pronounced.

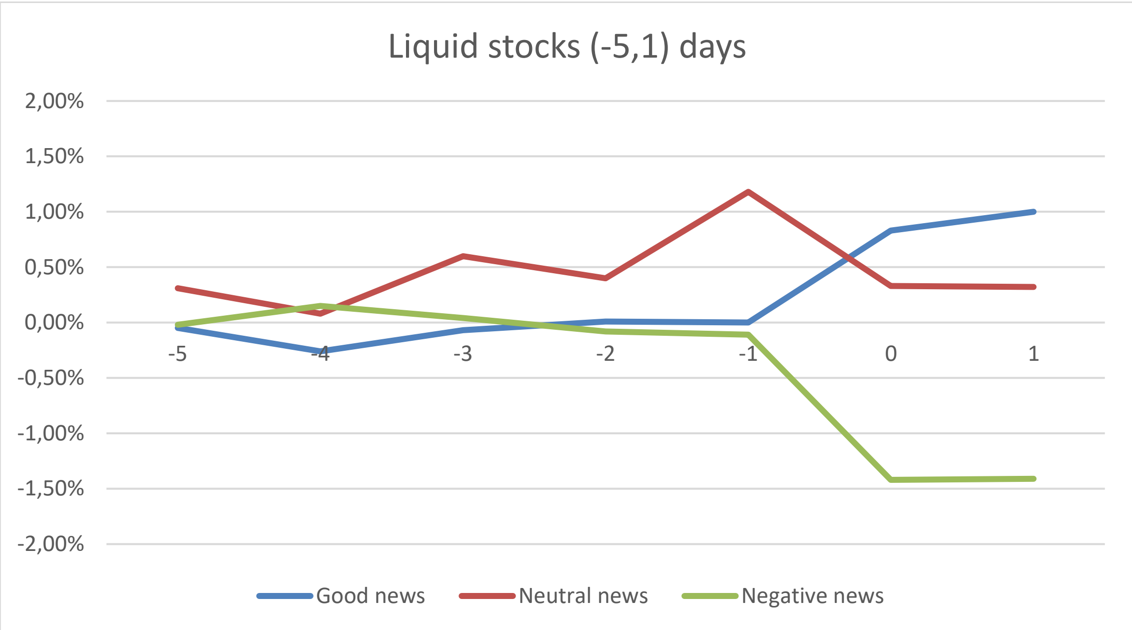

Figure 11. The CAARs for the liquid stocks in (-5,1) days around the event day.

The results for the liquid stocks in (-1,5) days around the event date are presented in table 5. As in the full sample, the positive drift seems to continue for two days after the announcement is given. For neutral news or negative news, there are not any significant abnormal returns occurring after the announcement day. Liquid stocks appear to be more efficiently priced instruments as they do not exhibit as significant abnormal returns around the event day. Partial explanation for this could be that better liquidity improves how efficiently the stock is commented and analysed in media.

Table 5. AAR, CAAR and significance results for the liquid stocks in (-1,5) days around the event date.

	POSITIVE ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	-0,01 %	-0,3119	0,2599	-0,01 %
0	0,83 %	9,5142***	3,0938***	0,82 %
1	0,16 %	2,0618**	1,1687	0,98 %
2	0,21 %	2,8871***	2,0619**	1,19 %
3	-0,04 %	0,0687	0,0919	1,15 %
4	0,11 %	1,5576	1,5362	1,26 %
5	-0,09 %	-0,8795	-1,0847	1,17 %
N	255	255	255	255
	CAAR (-1,5)	6,0445***	3,7388***	
	NEUTRAL ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,77 %	2,6731***	2,1912**	0,77 %
0	-0,86 %	-3,9146***	-1,6587	-0,09 %
1	-0,02 %	0,0202	-0,153	-0,11 %
2	-0,12 %	-0,7707	-0,8691	-0,23 %
3	-0,21 %	-1,0854	-0,8691	-0,44 %
4	0,19 %	0,6089	0,7284	-0,25 %
5	-0,26 %	-1,6455	-1,0405	-0,51 %
N	26	26	26	26
	CAAR (-1,5)	-1,5419	-0,9181	
	NEGATIVE ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	-0,03 %	0,9243	1,0505	-0,03 %
0	-1,31 %	-18,1441***	-5,0098***	-1,34 %
1	0,01 %	-0,3483	0,0818	-1,33 %
2	0,02 %	-0,2927	-0,3915	-1,31 %
3	0,15 %	1,6488	1,077	-1,16 %
4	-0,01 %	-0,4097	-0,4675	-1,17 %
5	0,01 %	-0,4739	-1,5023	-1,16 %
N	357	357	357	357
	CAAR (-1,5)	-6,9871***	-3,6273***	
	*** and ** indicate 1 % and 5 % significance levels respectively.			

Figure 12 illustrates how to the CAARs behave for good, neutral and negative news in (-1,5) days around the event day for liquid stocks. The CAARs fluctuate almost identically as in the full sample shown in figure 10, but good and negative news experience more fluctuations after the announcement day. Also, neutral news appears to generate more negative CAAR for the event window than in the full sample.

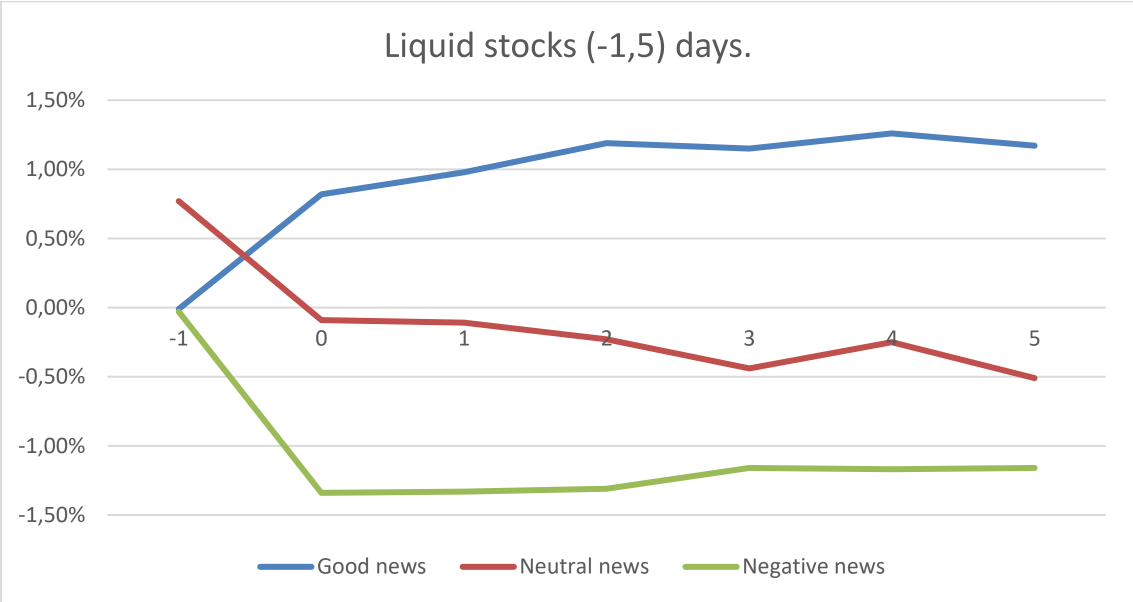

Figure 12. The CAARs for the liquid stocks in (-1,5) days around the event day.

Table 6 on the next page shows the results for the illiquid stocks in (-5,1) days around the event day. It can be noted that positive drift is greater in magnitude for illiquid stocks than for liquid stocks. As the drift starts two days earlier with illiquid stocks versus liquid stocks and the abnormal returns are larger and statistically more significant. Illiquid stocks that received neutral news seem to also generate more positive earnings in magnitude than liquid stocks, as their CAAR for the event window (-5,1) is 2,48 % versus 0,32 % for liquid stocks. However, negative drift associated with the negative news does not experience a greater drift in illiquid stocks than in liquid stocks. The development of CAARs for illiquid stocks during the event window (-5,1) are shown in figure 13.

Table 6. AAR, CAAR and significance results for the illiquid stocks in (-5,1) days around the event date.

	POSITIVE ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	-0,04 %	-0,5246	-0,5506	-0,04 %
-4	-0,17 %	-0,914	-1,1428	-0,21 %
-3	0,17 %	1,5712	1,2955	-0,04 %
-2	0,28 %	2,3657**	2,1561**	0,24 %
-1	0,42 %	3,9639***	3,3868***	0,66 %
0	2,2 %	18,6952***	7,035***	2,86 %
1	0,49 %	4,4409***	2,1075**	3,35 %
N	182	182	182	182
	CAAR (-5,1)	10,7088***	8,1755***	
	NEUTRAL ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	0,49 %	0,9993	0,4654	0,49 %
-4	0,31 %	0,9524	0,8449	0,80 %
-3	0,12 %	0,2829	0,0788	0,92 %
-2	0,12 %	0,5812	0,0501	1,04 %
-1	0,82 %	2,2779**	1,6253	1,86 %
0	0,27 %	1,1402	0,494	2,13 %
1	0,35 %	1,2928	0,4368	2,48 %
N	19	19	19	19
	CAAR (-5,1)	2,7705***	2,4129**	
	NEGATIVE ANNOUNCEMENTS (-5,1)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-5	-0,13 %	-1,7423	-1,3112	-0,13 %
-4	0,11 %	-0,8696	0,1134	0,02 %
-3	0,06 %	1,2898	0,8158	0,08 %
-2	-0,11 %	-1,492	-1,4297	-0,03 %
-1	0,18 %	2,1713**	1,9885**	0,15 %
0	-1,19 %	-15,4***	-5,6202***	-1,04 %
1	-0,04 %	-0,6149	-0,332	-1,08 %
N	350	350	350	350
	CAAR (-5,1)	-5,3983***	-4,5792***	
	*** and ** indicate 1 % and 5 % significance levels respectively.			

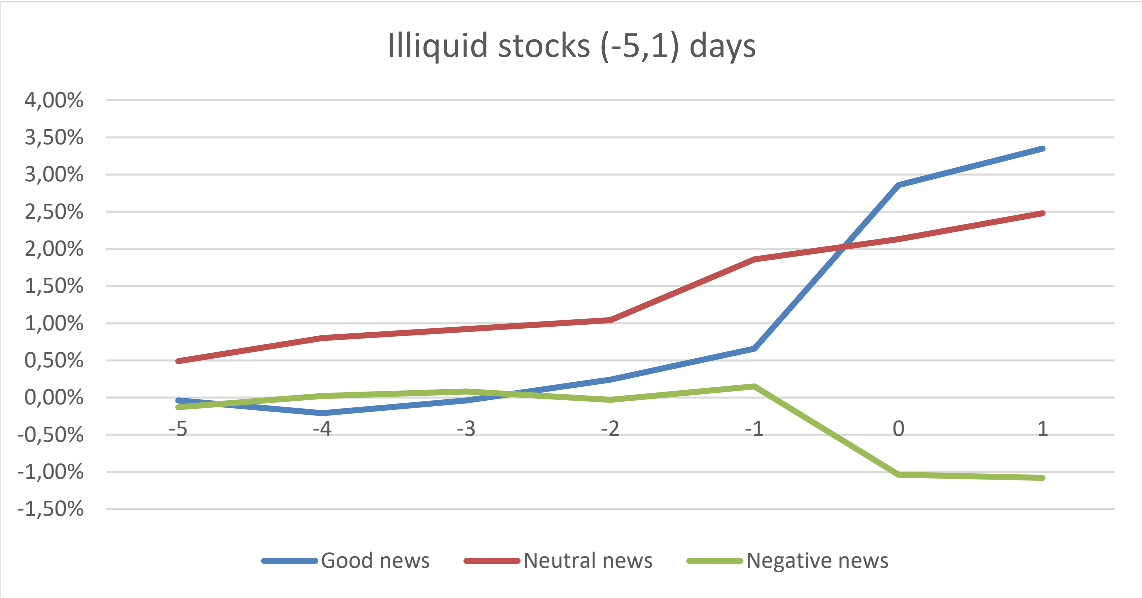

Figure 13. The CAARs for the illiquid stocks in (-5,1) days around the event day.

The results for the illiquid stocks in (-1,5) days around the event day are presented in table 7 below. The positive drift for the illiquid stocks continues to the second day after the announcement day similarly as in liquid stocks. This drift for the illiquid stocks seems to be only greater for the -2 days to +1 around the event day, as liquid stocks appear to generate significantly higher abnormal returns on +2 days after the announcement. Illiquid stocks and liquid stocks do not seem to experience any differences during +2 to +5 after the announcement for neutral news, as there are no significant abnormal returns, and both have CAARs that are insignificant for the used event window. As for the negative announcements, there seems to be significant returns on day +2 and +3 after the announcement day and on day +5 according to Generalized Rank Z. It seems that the illiquid stocks are the only ones experiencing a negative drift after the announcement day, although, the abnormal returns on day +1 are not significant. Additionally, the negative drift in illiquid stocks is greater in magnitude than in liquid stocks from +2 to +5 after the announcement day. Figure 14 displayed after the table 7 illustrates how the CAARs for illiquid stocks behave around (1,5) days around the event day.

Table 7. AAR, CAAR and significance results for the illiquid stocks in (-1,5) days around the event date.

	POSITIVE ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,43 %	3,9874***	3,3984***	0,43 %
0	2,19 %	18,6268***	7,035***	2,62 %
1	0,48 %	4,2864***	2,0635**	3,10 %
2	0,17 %	2,0181**	1,3094	3,27 %
3	0,01 %	0,0972	0,1319	3,28 %
4	0,04 %	0,2561	0,7519	3,32 %
5	0,11 %	1,0916	0,9763	3,43 %
N	182	182	182	182
	CAAR (-1,5)	10,563***	7,3196***	
	NEUTRAL ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,82 %	2,2929**	1,6754	0,82 %
0	0,25 %	1,1355	0,5012	1,07 %
1	0,33 %	1,2501	0,4081	1,40 %
2	-0,21 %	-1,1889	-0,5728	1,19 %
3	0,13 %	0,2964	0,3866	1,32 %
4	-0,3 %	-0,6225	-0,8162	1,02 %
5	-0,42 %	-1,3895	-2,2339	0,60 %
N	19	19	19	19
	CAAR (-1,5)	0,6675	0,9952	
	NEGATIVE ANNOUNCEMENTS (-1,5)			
T	AAR	ADJ. Patel Z	Grank Z	CAAR
-1	0,18 %	2,1489**	1,9718**	0,18 %
0	-1,19 %	-15,3547***	-5,6436***	-1,01 %
1	-0,04 %	-0,7064	-0,397	-1,05 %
2	-0,16 %	-2,0764**	-2,3355**	-1,21 %
3	-0,18 %	-2,0967**	-2,112**	-1,39 %
4	-0,07 %	-0,6267	-1,1794	-1,46 %
5	-0,09 %	-1,3475	-2,2187**	-1,55 %
N	350	350	350	350
	CAAR (-1,5)	-6,5117***	-5,3466***	
	*** and ** indicate 1 % and 5 % significance levels respectively.			

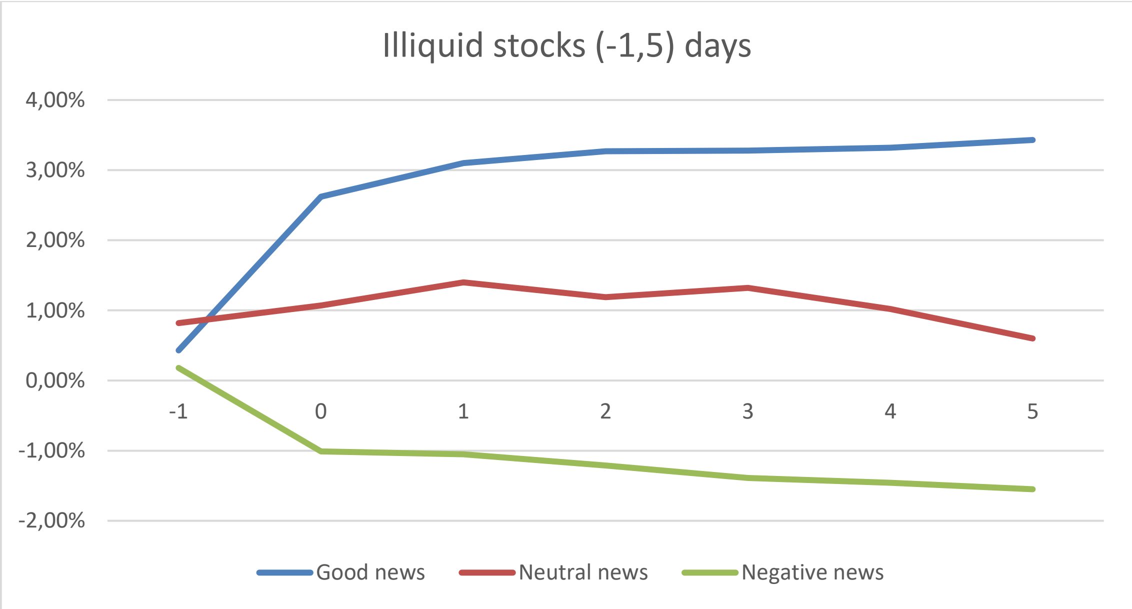

Figure 14. The CAARs for the illiquid stocks in (-1,5) days around the event day.

6. CONCLUSIONS

This study set out to investigate whether the post-earnings announcement drift exists in the Finnish stock market and do the illiquid stocks experience a greater drift in magnitude than liquid stocks. Earlier studies such as Kallunki (1996), Booth et. al. (1997) and others have only discovered a negative drift following a negative earnings announcement.

Unlike the earlier studies focusing on the Finnish stock market, the full sample used in this thesis was able to show that there is a significant positive drift that lasts from three days before the announcement to two days after that. Negative drift induced by negative earnings announcements was found to last from day before the announcement day to the announcement day, which differs from the earlier results. Neutral earnings announcements do not seem to cause any drift to happen as the abnormal returns are positive on the day before the announcement, which could imply that the market participants are betting on good news, but when the announcement is released the abnormal returns turn to negative as the expectations are not met.

Liquidity has been noted by some studies to be a factor affecting the possible abnormal returns cumulating from the post-earnings announcement drift. In this thesis the sample of 41 companies that were listed on the Helsinki stock exchange during sample period of 2010Q2 to 2017Q2 were divided by their liquidity to liquid and illiquid stocks. This analysis was able to show that the positive drift is greater in magnitude in illiquid stocks than in liquid stocks in -2 to +1 days around the event day. However, the negative drift does not seem to experience a greater drift in magnitude in illiquid stocks versus liquid stocks before the earnings announcement is released. Interestingly, the illiquid stocks seem to be the only stocks inflicting a negative drift after the announcement day. The negative drift that occurs after the announcement day in illiquid stocks is greater than in liquid stocks, as liquid stocks did not even experience a drift after the announcement day. Finally, illiquid stocks were found to exhibit a greater drift during (-5,1) event window for neutral news than liquid stocks, but during the event window of (-1,5) both have CAARs that are not statistically significantly different from zero.

As this thesis was conducted with 41 companies, which had the whole data available from the I/B/E/S database, it would be interesting to see if the results differed with more coherent data sample from the Helsinki stock exchange. Another interesting topic for future research could be, if it is profitable to follow a PEAD strategy in the Finnish stock market.

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APPENDICES

Appendix 1. Companies used and their respective symbols, industries and market caps.

Name	Symbol	Industry	Market Cap
Amer Sports Oyj	AMEAS	Personal & Household Goods	3,876,530,072
Atria Oyj	ATRAV	Food Industry	146,220,000
Basware Oyj	BAS1V	Software	417,656,000
Cargotec Oyj	CGCBV	Machinery	2,295,000,000
Citycon Oyj	CTY1S	Real Estate	1,603,000,000
Cramo Oyj	CRA1V	Industrial Services	707,898,000
Elisa Oyj	ELISA	Telecom	5,997,000,000
Finnair Oyj	FIA1S	Passenger Transportation	927,065,000
Fortum Oyj	FORTUM	Utilities	16,635,000,000
HKScan Oyj	HKSAV	Consumer Products	93,875,000
Huhtamaki Oyj	HUH1V	Containers & Packaging	2,838,000,000
Kemira	KEMIRA	Chemicals	1,594,000,00
Kesko	KESKOB	Retail – Consumer Staples	5,020,000,000
Kone Oyj	KNEBV	Electrical Equipment	23,030,000,000
Konecranes Oyj	KCR	Machinery	2,332,000,000
Lassila & Tikanoja Oyj	LAT1V	Waste & Environ Scvs & Equip	593,623,000
Marimekko Oyj	MMO1V	Apparel & Textile Products	176,353,000
Metsa Board Oyj	METSB	Containers & Packaging	2,238,000,000
Metso Oyj	METSO	Machinery	3,783,000,000
Neste Oyj	NESTE	Oil, Gas & Coal	17,717,000,000
Nokia Oyj	NOKIA	Hardware	27,423,000,000
Nokian Renkaat Oyj	NREIV	Automotive	3,877,000,000
Olvi Oyj	OLVAS	Consumer Products	603,017,000
Oriola Oyj	OKDBV	Consumer Products	422,460,000
Orion Oyj	ORNBV	Biotech & Pharma	4,056,000,000
Outokumpu Oyj	OUT1V	Iron & Steel	1,546,000,000
Outotec Oyj	OTE1V	Machinery	607,231,000
Ponsse Oyj	PON1V	Machinery	795,200,000
Raisio Oyj	RAIVV	Consumer Products	442,310,000
Ramirent Oyj	RAMI	Industrial Services	598,922,000
Sampo Oyj	SAMPO	Insurance	21,903,000,000
Sanoma Oyj	SAA1V	Media	1,503,000,000
Stockmann Oyj	STCBV	Retail – Discretionary	161,035,000
Stora Enso Oyj	STERV	Forest & Paper Products	9,220,000,000
Technopolis Oyj	TPS1V	Real Estate	742,360,000
Tieto Oyj	TIETO	Technology Services	1,882,000,000
Tikkurila Oyj	TIK1V	Chemicals	576,936,000
UPM-Kymmene Oyj	UPM	Forest & Paper Products	12,687,000,000
Uponor Oyj	UPONOR	Electrical Equipment	663,621,000
Wartsila Oyj	WRT1V	Machinery	8,515,000,000
YIT Oyj	YIT	Home & Office Products	1,139,000,000