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School of Business
Strategic Finance and Business Analytics

Post Earnings Announcement Drift in Nasdaq Helsinki post crisis 2009-2017

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ABSTRACT

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The post earnings announcement drift is an anomaly that was first discovered by Ball and Brown (1968) and been nominated by Fama (1998) to granddaddy of all anomalies. The prior literature has discovered PEAD all around the world with different datasets and models and wide range of explanations has been offered but none of them gained the reputation of being the complete. The purpose of this study was to investigate whether existence PEAD can be verified in Nasdaq Helsinki after financial crisis as technology has developed enabling information to move faster into prices.

This study consists of 1671 observations between 2009 and 2017 which are then divided into two sub-categories based on the company size and performance on the market. Data was derived from Bloomberg database and study was created by using event study -methodology. All results were relatively similar: information incorporated slower when news were positive compared to negative news confirming that information has transferred to prices in Nasdaq Helsinki between 2009 and 2017 relatively fast but PEAD still exists in some form. Large companies experienced wider reaction to positive news whereas negative information was adapted into all groups on the event date. Based on stocks performance on the markets, historical winners would have been optimal choice for investor in positive news -scenarios if PEAD was to be exploited as they carried the highest abnormal returns.

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1 INTRODUCTION

1.1 Background

In 1965, Eugene Fama presented his take on stock market's behavior and continued the idea in 1970 stating that current asset prices fully reflect all the information available and thus for investor it is impossible to beat the market in the long term. After his input, the information quality level of market has been divided into three forms: 1) Weak-form, where past cannot be used as a proxy for future but fundamental analysis can lead to additional profits; 2) Semi-strong-form, where all the public information is in the stock prices and new information is interpreted into prices the moment the new information comes public; 3) Strong-form, where all public and insider information reflects in the stock prices and it is impossible for one to beat the market in the long term.

Even though markets have been considered as strong or semi strong by researchers, there are repeating patterns called anomalies which are controversial to efficient market hypothesis such as size effect (Banz, 1981) where small stocks tend to outperform big stocks or January effect (Keim, 1981) where stocks' performance in January historically beats other months. Many of patterns that have historically been concerned as anomalies have decreased or disappeared in the past decades but not all.

One of the most persistent and researched anomalies is Post Earnings Announcement Drift (from now on PEAD) which means the phenomenon where stock prices movements follow the earnings surprise longer and stronger as it should when assuming functional EMH. It was introduced first time by Ball and Brown in 1968. Their main finding was that for some reason, security prices tend to continue moving up after positive news and down after negative news for numerous months after the earnings release which implies that the information doesn't shift into prices as instantly as strong or semi-strong EMH would require.

1.2 Research question, objectives and limitations

The main research objective is to find out the magnitude of PEAD in Helsinki Stock exchange in post financial crisis (2009-Q2/2017) and investigate if by grouping companies by features. First, companies will be divided into groups based on their accounting performance i.e. winners vs losers. Second, companies will be divided based on the size factor and comparing PEAD big companies vs small companies. By dividing companies into groups based on different features might help investor to further exploit allegedly existing PEAD and get abnormal returns. Additionally, it will be interesting to see how relatively small Nasdaq Helsinki performs compared to other markets. No such a study has been made after financial crisis in Finland and as technology has been evolving rapidly in the past years, information is moving faster and faster and thus it is not a foregone conclusion that PEAD exists in Nasdaq Helsinki.

Research question:
What is the magnitude of PEAD in Nasdaq Helsinki in 2009-Q2/2017?

Sub-questions:

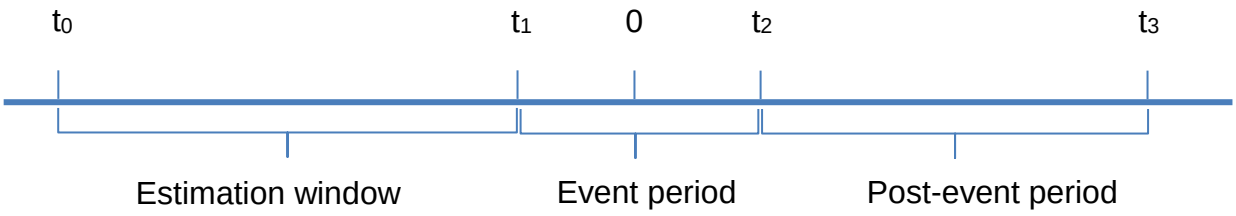
- Do small companies have longer drift than big companies?
- Do historical winners have longer drift than losers?

Research questions are relatively straight forward and the main objective is to find whether PEAD exists in Nasdaq Helsinki. In many historical studies (Jones and Litzenberg, 1970 ; Bernard and Thomas, 1989) portfolios are structured to take a long (short) position when positive (negative) surprise occurs but without transaction costs. In this study, no portfolios are constructed because including transaction costs was limited from the study and creating portfolios without them is rather artificial.

1.3 Method

Event study is an empirical method developed to measure the effect of single events to asset prices. It was made known by Fama, Fisher, Jensen and Roll (1969) and since then it has been widely used not only in Finance but also in social sciences. The basic idea behind it is to define stock's normal behavior for certain period of time and investigate how stock behaves around the event date. The picture of below shows event study measurement periods:

Figure 1. Event study time line

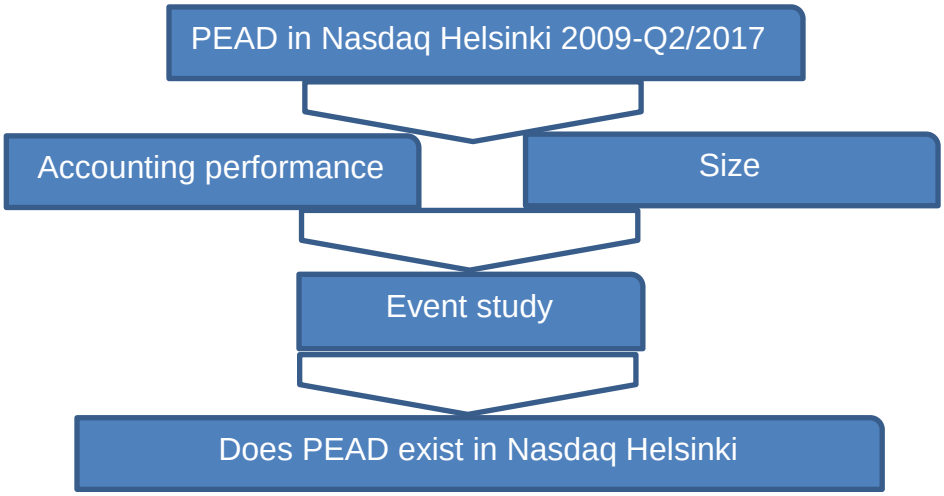


In the picture, the area between t_0 and t_1 is described as estimation window which is derived by the researcher in order to find the best historical length of modelling the stock performance to build the best possible comparison of normal return for asset in order to find abnormal returns for asset. The area between t_1 and t_2 means the actual event window and 0 is the event date. The abnormal returns are calculated comparing the predicted returns which are based on estimation window and actual returns occurring in the event window, abnormal returns are calculated. The area between t_2 and t_3 is known as post-event window and it can be used for long term event studies but Kothari (2001) states that long term event studies might be exposed to market frictions and irrational behavior which obviously means that the behavior of asset returns cannot be directly traced back to the event.

1.4 Structure and scope

The research starts by going briefly through in the first chapter the background of the phenomenon and continues to explicate the objectives, research question and sub-questions. First chapter continues to describe the chosen method for this study and ends with breakdown of the scope and structure of the study. The second chapter outlines the context in link with PEAD and sums up theory and earlier literature. Third chapter defines the method in detail and fourth chapter gives reader a view of the data behind the model. Fifth chapter answers to the research questions and goes through all the findings of PEAD in Nasdaq Helsinki for 2009-Q2/2017. In the last chapter the conclusion is drawn and potential future research subjects are discussed. The structure and scope for study is delineated in the picture below:

Figure 2. The structure and the scope of the study



2 LITERATURE REVIEW

2.1 Assumptions behind PEAD

Post-earnings announcement drift occurs after positive or negative earnings announcement compared to market's predictions. There are a few key drivers which need to be understood before any analysis can be done.

1) Efficient market hypothesis is the base for multiple models in financial literature and its creator Eugene Fama one of the most cited financial researcher ever. Efficient market hypothesis acts as a base level for information content in the markets.
2) All investors do not possess same information. However, in the past fifty years investors have gained access do better data and regulatory changes have standardized the differences in financial information between companies, industries and even continental markets.
3) As information is accessible, behavioral factors are taken under the microscope such as what are analysts' incentives or psychological features of investors.
4) PEAD is still on the run, the reason for its existence has not found out even though good theories have been presented. Eugene Fama (1998) calls PEAD the "granddaddy of underreaction events".

2.1.1 Efficient market hypothesis

As stated in the introduction chapter, efficient market hypothesis took its place in the finance literature a generation ago and still continues to drive to be the benchmark of testing how the new information transfers into asset prices. In the first study, Fama (1970) defined three levels which are:

Weak form: Assets' behavior follow random walk and past is not a crystal ball for future. In the long run, there are no excess returns but skillful market participants can outperform the market by fundamentally analyzing the information content.
Semi-Strong form: All public information is included in the share prices and information transfers into prices rapidly. No fundamental analysis can offer any excess returns.
Strong form: Share prices also include private information and there are no excess returns, even with the private information

From the very beginning, the theory had a joint hypothesis problem. It occurs because when testing market efficiency using a model, it is rather difficult to identify whether the results vary due to inefficient markets or just poor model and Jensen (1978) points out that the tests may fail because either one assumption is false or both are which creates a paradox where market efficiency can never be perfectly tested. However, this has not stopped the researchers from trying and the shift moved to define more detailed explanation for strong market efficiency detailing the role of information set (Jensen, 1978) and Malkiel (1992) and concluding that in the market, no excess profits are possible when trading on the basis of information set if market is efficient. Even Fama (1991) stated on the old terms of efficient market forms in his review of capital markets that "At the risk of damning a good thing, I change the categories in this paper". His view was now more focused on to modify the efficient market hypothesis to match with empirical findings controversial to it. The weak form was changed to "tests for return predictability" and he included predicting returns using dividend yields and interest rates in the scope which means that the scope of market efficiency should be viewed through the lens of measuring how well returns can be forecasted. For semi-strong form, the change embodied to the name: "event studies". As introduced earlier, event studies have become one of the most used testing form when investigating how fast new information transfers to prices. The strong form name was changed to "tests for private information" and, as the name suggests, it focuses on testing if private information is present. Basically, he rejected the old idea of strong form and that market are efficient because it surely is false just because trading costs exists. However, it serves as a

benchmark for the whole idea of market efficiency and thus acts as a corner stone for the whole concept.

2.1.2 Earnings surprise and analyst forecast

When company's actual earnings per share differ considerably from the estimate on the market, it is called earnings surprise or unexpected earnings. The expected earnings in the literature are either modelled with time-series models or Analysts' forecast consensus. In this work, analyst consensus is used as a proxy for street estimate for earnings for those companies which are followed by analysts. Consensus is an average of all analysts' forecasts and even though it should not be portrayed as a crystal ball of the future, actual earnings deviations from consensus usually cause significant market reactions (see Skinner and Sloan, 2002; Kinney, Burgstahler and Martin, 2002). Analysts' forecasts are not only used among investors but those have also impact on manager's behavior. Burgstahler and Eames (2006) documented evidence that cash flow and accruals are managed to meet analyst forecasts and given extra consideration if negative earnings surprise was on the horizon.

Although consensus estimate is widely accepted proxy for estimate in the academic world and used in the real world, there are substantial amount of research related to its qualifications for the job. Das, Levine and Sivaramakrishnan (1998) investigated whether analyst forecasts are too optimistic and found out that analysts tend to forecast more optimistic earnings on companies which are more difficult to predict. Hong and Kubik (2003) shared the same on worry on too optimistic forecasts when they investigated analysts' career concerns with US data between 1983 and 2000. They represented two-folded problem: on the one hand, those analysts whose forecasts are more accurate, tend to move up in their careers and thus they have direct incentive to give as accurate forecasts as possible but on the other hand, Hong and Kubik stated that some broker houses are rewarding analysts on too positive forecasts if the underwriting relationship exists with broker house and the stock. Additionally, they showed that analysts are rewarded in some cases for just generally promoting stocks

with too positive forecasts. Considering that analysts forecasts are biased, the magnitude of the behavioristic pricing problem can be estimated in a few ways. First, Hilary and Hsu (2013) investigated if more accurate analysts had bigger impact on prices and found out that their hypothesis was valid. The explanation was similar to Hong and Kubik's (2003), where analysts are rewarded with better careers and higher chance to get credibility followed by accurate forecasts. Second, So (2013) investigated if analysts forecasts are popular among the investors and stated that investors heavily overweight analysts forecasts in their valuation which leads to conclusion that even if analysts with higher accuracy are more able to move prices, some bias exists because of the questionable rewarding system related to relationships between brokerage houses and companies. Chen and Jiang (2006) investigated how analysts weight information and came into conclusion that private information overweights the public information.

2.1.3 Information uncertainty and agency problems

When considering PEAD, one must start to dig into the information content of earnings as without speculation of additional information in the earnings announcements, there would not be PEAD. The idea of new information is best crystalized by Kothari (2001) as he stated that his most significant finding was that regulated financial reports offer new and appropriate information to stakeholders. However, when it comes to the accessibility of that information and presumptions behind markets, it is a different story. For example Chen and Jiang (2006) discovered that analysts overweight private information compared to public information, which leads to result where different parties have different information of stocks' behavior.

Regarding PEAD, information certainty takes place when investors cannot decide whether unexpected earnings are fully reflected on stock market reactions. On the markets there are different investors with different access to data which leads to relatively old concept of information asymmetry. It arises when different parties have different level of information and was introduced to financial literature by Akerlof (1970)

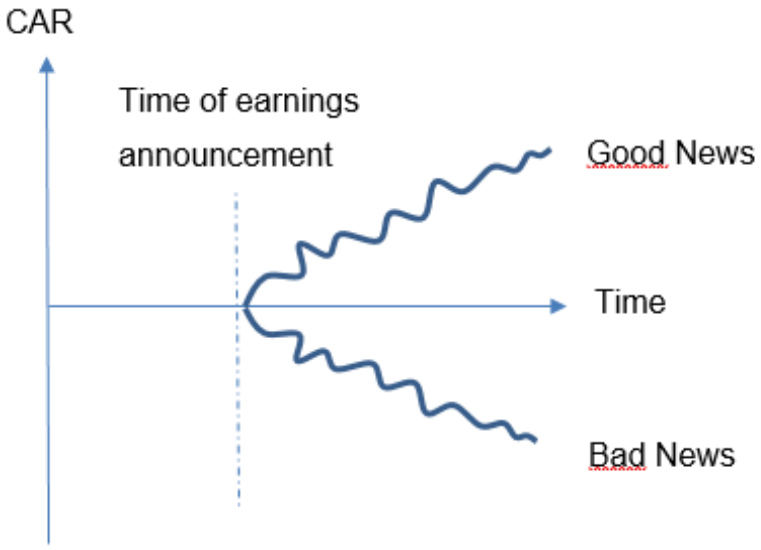
arguing that if investors cannot separate good businesses from bad businesses, they price all businesses on average level. This creates an incentive for legislators and good businesses to find means to fix the problem for capital markets to function properly. The existence of auditors is one example of intermediaries created with legislation to make sure that financial results which companies report are reliable and for example Leftwich (1983) showed that audited financial information is required by the banks. Additional interesting note for the discussion related to auditors is that even with their key role as information qualifier for capital markets, Healy and Palepu (2001) summarize the literature related to it arguing that research does not provide proof for auditors enhancing financial report credibility which is in line with Dodd's (1984) finding that investors do not gain new information from qualified audit opinions. Another problem related to motivation and incentives is agency problem. Jensen and Meckling (1976) defined it as problem which is born because investors do not act in the management of company but rather are just bystanders waiting their investment to gain profits. The best-known example to reduce this problem is to appoint a board of management to watch over the management.

2.2 Post earnings announcement drift

Post earnings announcement drift occurs when unexpected earnings cause unexplained reaction in stock's price. As Fama stated in 1970, semi-strong form of market efficiency assumes new earnings information to be transferred into prices immediately when earnings release occurs which is controversial to drift which might continue for several days or even start before the actual earnings announcement date implying that there is trading based on insider information (Ball and Brown, 1968). However multiple other explanations for this persistent anomaly has been presented related to behavior and information but none of them has gained a reputation as a best fit theory to explain post earnings announcement drift fully.

Post earnings announcement drift is visualized in the picture below. Axis present Cumulative Abnormal Return over time and theory is that when positive earnings surprise occurs (good news), the higher abnormal earnings are over the time (drift). Same goes in reverse for negative earnings surprise.

Figure 3. Post earnings announcement drift



Historically, studies on PEAD have been concluded using time series models (e.g. Jones and Litzenberger, 1970 ; Bernard and Thomas, 1989 ; Kallunki, 1996) but the later studies have been concluded mostly using analyst consensus as estimate for future earnings or with both, consensus and time series model (e.g. Dische, 2002 ; Liu et al., 2003 ; Francis et al., (2007). It is important to understand the difference between these approaches. Time series models are based on market models such as Capital Asset Pricing model or Fama-French three factor model which lays foundation on the research that individual investors know how to use them correctly. When it comes to Analysts' consensus, individual investor can use it as a proxy for best estimate for future earnings and estimate the market reaction based on that rather than single time series model and thus even though Market models (and obviously different kind of key figure ratio models etc.) are base for consensus, the information is available for wider growth

and thus the spread of additional information in earnings announcement should interpreted in the prices faster.

Research of on post earnings announcement drift has historically been divided into two; academics have first tried to confirm its existence on different markets as an anomaly and violator of market efficiency and secondly find reasons and explanations why it occurs without fully succeeding in identifying the factors behind the drift. Critics have concentrated on the models behind the data even though quality of data has improved through the years and some of the problems driven by it have been tackled. These subjects will be discussed further in the next chapters.

2.2.3 Proposed theoretical reasons for PEAD

The explanations for post earnings announcement drift can be divided into few categories, the ones holding the flag in the most recent studies are irrational investor biases, compensation for risk and problems with models driven by joint hypothesis bias.

When considering irrational investors, one most to consider momentum-effect which occurs in finance when winners keep winning and losers keep losing i.e. when stock's price continues to rise (decrease) after great (bad) historical performance without any scientific explanation. When considering PEAD, it is the same phenomenon and thus many of explanations offered are the same as in the momentum anomaly saying basically that investors are not rational. First explanation to irrationality of investors is underreaction to news such as earnings announcements if PEAD is used as example. In 1992, Bernard found out that portfolio with high standardized unexpected earnings beat the portfolio with low standardized unexpected earnings by 4.2% on 60 days period which can be interpreted as a proof that new information does not transfer into stock prices rapidly but rather new information is incorporated slowly into prices which is controversial to semi-strong form of efficient markets. The second explanation is investor overconfidence which was recorded for example by Daniel, Hirshleifer and Subrahmanyam (1998). They stated that these overconfident investors increase

autocorrelations and thus create momentum and drifts by their own actions. Griffin and Tversky (1992) shared their opinion and showed that investors give less attention statistical power compared the attention they give to value the strength of evidence they receive. Another supportive research for this came in 2008 from Imam, Barker and Club, who showed that very often analysts use “hunch” when valuing a company. Barberis, Shleifer and Vishny (1998) agreed with both theories and continued to create a model based on investment behavior in these situations. However, this problem with irrational investing is not a new in finance literature and for example Varian (1985) presented that prices might include additional risk factor related on investors’ opinions divergence on asset price. Garfinkel and Sokobin (2006) continued this view and proofed that unexplained trading volume exists around earnings release which they interpreted to be indicator of opinion divergence between investors and thus this irrational investor bias could be priced.

As stated earlier, the irrational investor behavior can be modeled and thus priced, it is not the only risk that academic literature points out even though all roads lead to information in the end. For example, Francis et al. (2007) found out that in rational if there is high information asymmetry, investors’ behavior can be used to explain PEAD in the United States between 1981 and 2001. Partly same logic goes for Chordia et al. (2007) who presented that PEAD is higher with illiquid stocks due to high trading costs in illiquid stocks and presented that liquidity premium might be the driver behind PEAD. Also, Sadka (2006) shared the view on liquidity risk premium as explanatory factor for PEAD. This is highly related to the Size effect (e.g. Fama, 1993) where small market capitalization stocks have historically outperformed other stocks (illiquid stocks often are small stocks). Relatively same logic goes for Arbitrage risk (Wurgler and Zhuravskaya. 2002) which was used to explain PEAD by Mendenhall in 2004. Theory relates to the assumption that if irrational investors cause arbitrage opportunities when earnings information is released, arbitragers should eliminate it when chance is seen. However, Mendenhall presents that arbitrage risk is highly positively correlated with PEAD opportunities.

A few additional explanations have been offered to explain PEAD. For example, Bernard and Thomas (1989) stated that betas are moving up (down) if the news are positive (negative) during the years due based on the hypothesis that that the firms where good news happen might be riskier versus bad news when compared to portfolio that is used as benchmark. They found that betas actually do shift in the predicted direction but not enough in order for it to fully explain PEAD. Kim and Kim (2003) explained PEAD by adding fourth factor into Fama's three factor model, which modelled the information content of earnings; they assumed that investors expect earnings surprise and by their own actions create the PEAD.

2.2.4 Existence of PEAD – International and Finnish evidence

Traditionally, PEAD has been investigated in US markets pioneers being Ball and Brown, who spotted the drift first in 1968. Many more research has been conducted since and for the US maybe the most famous article came from Bernard and Thomas, who found in 1989 that 18% (annualized) long position return in 240 days holding period investigating US market between 1974-1986 and continued in 1997 handling PEAD as an anomaly and found returns as well. After that, many more have confirmed PEAD and tried to explain it with numerous factors. For example, Livnat et al. showed that PEAD is far larger when Analyst consensus is used as base estimate for earnings compared to time series models. Francis et al. (2007) found PEAD in US for 1982-2001 and Chordia et al. (2007) modeled liquidity premium for PEAD and found out that PEAD exists especially for illiquid stocks.

In the past decades, also other continents have reported similar results. For example, Liu, Strong and Xu (2003) confirmed its strong existence in the UK market, Forner and Sanabria (2010) in Spanish market and Dische (2002) for German market. However, van Huffel et al. (1996) did not conclude drift in Belgium market which states that PEAD cannot be taken as granted phenomenon in all markets even though the reason might be the model rather than existence of the PEAD.

Additionally, PEAD has been confirmed in the Finnish market. Kallunki (1996) investigated annual earnings announcements between 1990 and 1993 applying three different models to see whether PEAD exists in the Finnish stock market. The first model used only accounting information, second was a market model and third was a mix of the two. He concluded that all three models found evidence that good news were followed a positive peak in the earnings on announcement day but it disappears in the next days. However, for the negative news, the drift exists and does not disappear with all models used. He explains the negative drift by Finnish legislation which in that time had a restriction in short selling and further continues that in the Finnish market, there might be so called informed investors who already have better quality information on earnings which offsets the positive drift.

2.2.5 Criticism of PEAD

As discussed earlier in the paper, joint hypothesis problem occurs when PEAD has been tested and obviously the most common criticism related to PEAD is the argument of methodological weaknesses in the models. First studies were published with quarterly or monthly data due to the lack of daily data which increases the chance of model misspecification as causality remains unclear. When daily data was first introduced, the methodology of using assumed earnings announcement dates rather than actual dates questions the whole study, especially as the biggest impact happens around the announcement (Charles and Litzenberger, 1970) and thus even the most cited papers are questioned. Jacob, Lys and Sabino (2000) questioned Bernard and Thomas' results arguing that their results are based on wrong model used to interpret unexpected earnings. These same kinds of approaches have been common in the recent decades as transaction costs have been taken under consideration. For example, Chordia et al. (2007) showed that adding transaction costs in the model can decreases PEAD.

Also, behavioral models have faced some arguments related to the problem that models can't separate investors under- and overreaction, which weakens theoretical coherency of models. Additionally, Fama (1998) stated that sometimes behavioral models are fitted to explain recent behavior and thus can be compared to data snooping. Even though methodology has been questioned, it is proven that PEAD is not only academic phenomenon. Ke and Ramalingegowda (2005) investigated whether PEAD is exploited as investment opportunity and came to conclusion that those traders who are trying to maximize short term profits, exploit PEAD actively.

3 EMPIRICAL METHODS

As described in the introduction's method-chapter, Event study has been widely used through the last decades to investigate financial markets and impact of certain events to asset prices. Kothari and Warner (2006) summed that over 500 event studies have been published in the recent decades and the number is vastly growing. The logic behind event studies has not changed since the first ones (MacKinley, 1997) although the use of daily has become a new standard instead of monthly due to better data availability.

The objective behind event study is usually divided (Kothari, 2001) into two time frames, to investigate long-horizon performance or short-window impact caused by the event. Long-Horizon event studies have historically been used to study events such as mergers (e.g. Rau and Vermealen, 1998) or public offerings (e.g. Ritter, 1991) but when considering earnings announcement, a new announcement comes every quarter which means that exploring the magnitude of one earnings announcement event to asset returns for several months or even years, is shadowed by possible statistical biases and even other earnings announcement events and thus in this study, only short term event study will be applied. The observation period will thus be build ten days before and after the event date. For estimation period, 100 days is used in order to get large enough estimation window for stocks' normal behavior.

3.1 Cumulative average abnormal returns

Maybe the most important item in event studies are abnormal returns which arise comparison of modelled expected normal returns and actual returns. This study will follow the example of Fama, Fisher, Jensen and Roll (1969) to calculate cumulative average abnormal returns. It is a three-step process and starts with calculating the daily abnormal returns:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (1)$$

Where

AR_{it} = Abnormal return

R_{it} = Actual return

$E(R_{it})$ = Normal return estimated for time period

The field of estimating the normal returns divides into few models which either are market based or statistical. The simplest statistical model is constant mean return model which assumes that returns are constant over time but vary by company. It is rather simple and does not capture all the dimensions that other models do but Brown and Warner (1985) stated that for short term event studies do not differ from the results of more sophisticated models. The other statistical models usually base on Capital Asset Pricing Model (CAPM) but in the footsteps of Fama and French (1993) or Carhart (1997) the number of factors are adjusted with factors such as size or momentum in order to have more detailed model in estimation.

Although factor models can give a good estimate of expected returns and stock's behavior, the universal conclusion is that market model is a great measure for rate of return (Binder, 1998). In a nutshell, marked model is a result of regression of chosen asset's returns market's returns and can be modeled linearly as:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (2)$$

Where

R_{it} = Period t return for asset i

α_i = Regressions variable for asset i

β_i = Regression variable for asset i

R_{mt} = Period t return for market portfolio

ε_{it} = Disturbance term, assumed to be zero

To find the daily abnormal returns, the difference of predicted returns and actual returns shall be calculated:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (3)$$

Now that daily abnormal returns are calculated, average abnormal returns can be calculated. Average abnormal return (AAR) is an average from all stocks (N) in the sample:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t} \quad (4)$$

The third and final step is to sum the average abnormal returns over the selected event window days (T) to calculate cumulative average abnormal return (CAAR)

$$CAAR_t = \frac{1}{N}\sum_{i=1}^{T} AAR_t \quad (5)$$

Cumulative average abnormal earnings are better than just daily abnormal earnings when studying the effects of earning announcements as the daily stock prices might flow from day to day from negative to positive but with cumulative returns, the trends can be interpreted.

3.2 Testing significance

Statistical significance occurs when probability of rejecting null hypothesis (H_0) is true considering probability limits that are set for study. For example, in abnormal earnings -studies one should test whether ARs, CARs, AARs and CAARs occur randomly (H_0) or is there a clear pattern where they follow/precede the event. The most common significance test is basic t-test:

$$t = \frac{\bar{x} - \mu_0}{s(\sqrt{n}} \quad (6)$$

Where,

$\bar{x}$ = sample mean

μ_0= test value

s = sample standard deviation

n= sample size

However, as population standard deviation is known, and sample size is relatively large, z-score should be used. Additionally, usually significance tests are grouped either parametric or nonparametric tests. Nonparametric do not assume normal distribution for abnormal returns whereas parametric tests do. The real power of nonparametric tests lies in their ability to exclude outlier-effects (Schipper and Smith, 1983) whereas parametric tests could reject null hypothesis under the effect of a few outliers. For this study, Patell (1976) method is chosen to represent parametric tests and Corrado rank test for nonparametric tests. Patell test:

$$Z_{patell} = \sqrt{\frac{n*(L1-p-3)}{L1-p-3}}\ \overline{SCAR\tau} \quad (7)$$

Where,

n = cross-section observations

L_1 = length of estimation period

p = number of explanatory variables in abnormal return regression

$\overline{SCAR\tau}$ = average standardized cumulative abnormal return

However, Kolari and Pynnönen showed that Patell (1976) rejects H_0 sometimes too easily because the model assumes cross-correlation of abnormal returns as zero which is not often true especially when observations are clustered (Kolari and Pynnönen, 1987) and they modeled adjusted Patell Z-test which is also used in this study:

$$Z_{patell} = Z_{patell}\sqrt{\frac{1}{1+(N-1)\bar{r}}} \quad (8)$$

Where

$\bar{r}$ = average of the sample cross correlation in the abnormal returns estimation period

This approach is more robust to not reject H_0 when abnormal returns are cross correlated.

Second test that is used in this study is based on Corrado rank test (Corrado and Zivney, 1992):

$$K_{it} = Rank\ \frac{GSAR_{it}}{T^{'}+1} \quad (9)$$

Where

$i = 1, \dots, n$

$\mathrm{t} = (\mathrm{T}_0 + 1)_{\text{First obsevarion}}, \dots, \mathrm{T}_2$ (Last observation in cumulative event day)

$\mathrm{T}' = \mathrm{T}_2 - \mathrm{T}_0 = \mathrm{T} - \tau + 1$

$\tau = \text{CAR period lenght}$

$\mathrm{GSAR}_{\mathrm{it}} = \text{Generalized standardized abnormal returns}$

However, this test was first defined only for one day event window. Kolari and Pynnönen (2008) shared their view how to make it efficient for multiday event window:

$$z_{grank} = \frac{\overline{K_0}}{\overline{S_{K_0}}} = \sqrt{\frac{12N(L1+2)}{L1}} K_0 \qquad (10)$$

Where,

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

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

$L1$ = Length of estimation period

N = Number of non-missing returns across firms

As adjusted Patell-test and GRANK are considered the most powerful regarding event studies, one must remember that both of these should be considered when making the decision to reject null hypothesis. Historically, parametric tests are maybe more used but for example Fama (1970) stated that daily returns have large skewness and kurtosis which gives more validity to nonparametric tests.

4 DATA AND SAMPLE SELECTION

4.1 Sample and data

Data is derived from Bloomberg database and tests run using event study calculator (Eventstudytools, 2017). Used factors are listed in the table below:

Table 1. Derived data

Data	Explanation
Daily historical stock prices	Historical stock prices of 126 stocks. Logarithmic prices used in test
Daily Nasdaq Helsinki prices	Daily prices of Nasdaq Helsinki Index. Logarithmic prices used in test
Actual EPS	Actual diluted Earnings Per Share for Quarter
Analyst Consensus Forecast EPS	Bloomberg Analyst Consensus for quarter Earnings Per Share
Analyst forecast standard deviation	Standard deviation of analysts' forecasts from which consensus is derived

The maximum data set available for Q12009-Q22017 is 4126 observations which is derived from 34 quarters times 124 companies listed in Nasdaq Helsinki during this period. However, not all data was available in the Bloomberg database for multiple reasons which are listed in the table 2 below:

Table 2. Excluded observations

Category	Reason	Observations	Observations excluded
TOTAL NASDAQ HELSINKI	34 Quarteers x 124 Companies	4216	
No data on Bloomberg	29 Companies	3230	986
Actual EPS	Not Listed	2869	361
Actual EPS	No Data	2428	441
Actual EPS	Merger or Daughter	2247	181
Analyst Forecast	No Forecast	2081	166
Number of Analysts	0 Analysts	2073	8
Number of Analysts	1 Analyst	1740	333
EPS Forecast STDEV	Missing or 0	1671	69
	Total Observations	**1671**	**2545**

The biggest single factor is lack of company details in Bloomberg and for 29 companies, which were mostly small, analyst data was not available and thus 986 observations

were excluded based on that. Next, 361 observations were excluded because a few companies were not listed for the full period and 441 observations were excluded as no actual EPS value was available for those quarters. A few companies were bought or merged with another company during study period and 181 observations were excluded. Especially in the beginning of data period, some companies had only zero or one analyst forecast which obviously cannot be interpret as conclusion and another 8 and 333 observations were excluded respectively. Finally, a few observations were missing EPS forecast standard deviation and 69 observations were excluded. In the end, 1671 observations present the full data set used in the study with total of 2545 excluded observations.

The sample presents bull markets as Nasdaq Helsinki has experienced 111% increase since the starting period of 1.3.2009 to study end period of 2.10.2017. Here is the graph to demonstrate Nasdaq Helsinki performance and line where study period begins. The most resent positive trend has started already in 2012 as the figure 4 shows and it seems to be continuing.

Figure 4. Nasdaq Helsinki 2008-2017 (Kauppalehti, 2017)

4.2 Data classification

Full data set of 1671 observations is split in two different ways. First, set is split into Large Cap companies and Mid&Small Cap companies based on classification in Nasdaq webpage (Nasdaq, 2017). Second, set is split between “Winners” and “Losers” based on their performance in study period. Each company’s stock price was compared to Nasdaq Helsinki and final winners and losers are top and bottom quartiles of that comparison. Nasdaq Helsinki has risen between 31.3.2009 and 2.10.2017 110.7% whereas Winners 259% or more and Losers 62% or less. Data statistics are listed on the table below:

Table 3. Excluded observations

Category	Observations	Subcategory	Observations
Total	1671		
Large Cap	800	Winners	472
		Losers	102
Mid&Small Cap	871	Winners	163
		Losers	206
Winners	635	Large Cap	472
		Mid&Small Cap	163
Losers	308	Large Cap	102
		Mid&Small Cap	206

Winners vs Loser present the full data set but one should note that subcategories differ remarkably; Large cap contains 472 winners versus only 102 losers whereas Mid&Small Cap has only 163 Winners compared to 206 Losers which indicates, if simplified, that large companies have outperformed small companies in study period. This might to do with investors’ behavior in financial distress; large companies might have experienced steeper drop compared to small ones and thus also reversion has been wider.

4.3 Earnings surprise

Analyst forecast method is chosen in this study to represent earnings surprise as it has become widely accepted estimate for earnings and differences in analyst forecast consensus to actual earnings have proven to cause significant market reactions (Skinner and Sloan, 2002; Kinney, Burgstahler and Martin, 2002). There are many ways to standardize earnings surprise and this study follows same model as Kaestner (2006) where unexpected earnings are standardized using analysts' forecast consensus standard deviation:

$$Standardized\ unexpected\ earnings\ = \frac{Actual\ EPS - Analyst\ forecast\ EPS}{\frac{Analyst\ forecast\ EPS}{\sigma(Analyst\ forecast\ EPS)}} \quad (11)$$

The model accounts for deviation in analyst opinions through denominator as more diverted opinions result higher surprise.

5 Findings

5.1 PEAD in Nasdaq HELSINKI 2009-Q2/2017

Study sample consists of 1671 observations form which Good news, No news and Bad news have 566, 691 and 414 observations respectively. Figure 7 shows stock price behavior after 10 days before and 10 days after event day.

Figure 5. Post earnings announcement drift for full sample

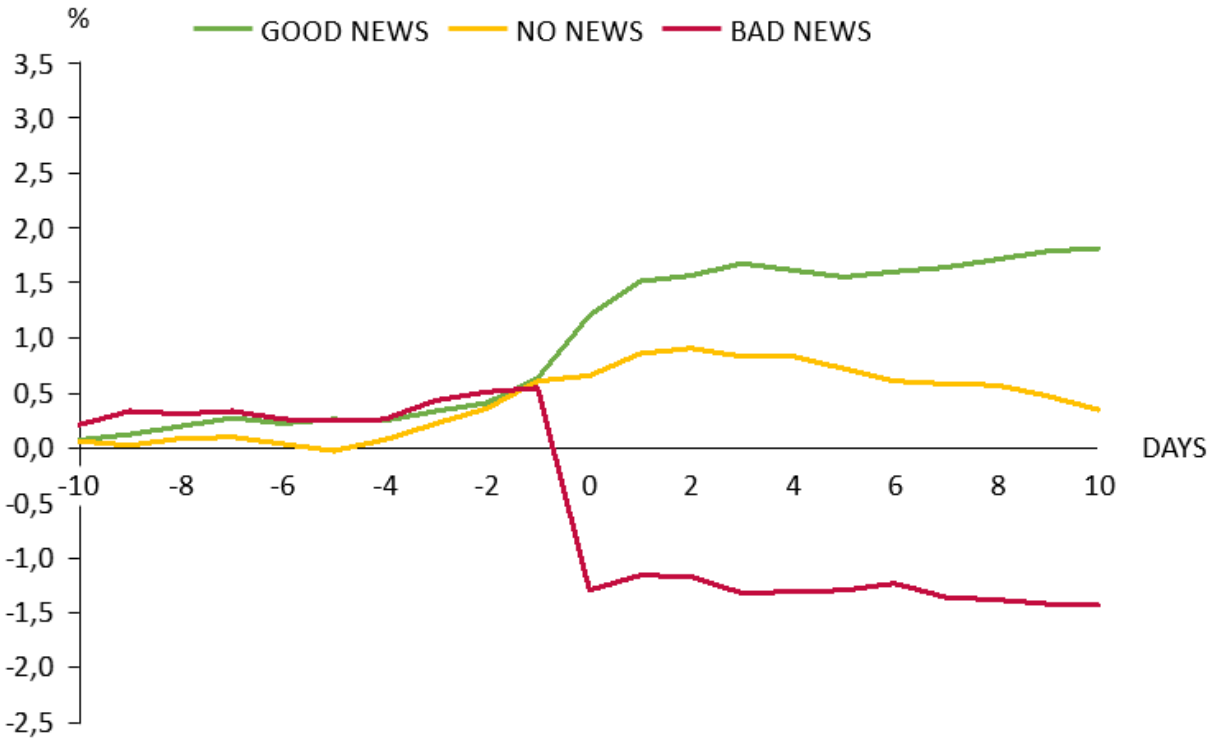


Figure 5 shows that earnings surprises clearly have an impact to stock price behavior showing that positive news increase the stock price and negative news decrease it. Interesting note is that all of the groups have experienced approximately 0.6% increase before the event (not significant) which could imply that in the bull markets, investors bet positive before the earnings announcements. Good News has sharpest curve on the event date henceforth the effect dilutes on first and second day after the event and finally staying on that level for the rest of the observation interval. No News seems to

be walking quite random; a slight increase after announcement which is followed by decrease resulting the similar level in the end of the observation period as it was before the event. Bad News has steepest curve on event day but after the drop, behavior stables.

Table 4 shows average abnormal returns and cumulated average abnormal returns for Full sample and significance which was measured by adjusted Patell-test and Generalized Rank test.

Table 4. AARs, CAARs and significance tests for Full sample in [-10;10] days around event date

t	GOOD NEWS				NO NEWS				BAD NEWS			
	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR
-10	0.07 %	0.55	0.32	0.07 %	0.06 %	1.18	1.21	0.06 %	0.21 %	**2.5***	**3.25****	0.21 %
-9	0.05 %	0.55	-0.07	0.12 %	-0.04 %	-0.93	-0.32	0.02 %	0.12 %	1.64	1.09	0.33 %
-8	0.07 %	0.89	0.71	0.19 %	0.06 %	0.47	1.06	0.08 %	-0.02 %	-0.29	0.64	0.31 %
-7	0.08 %	0.69	0.32	0.27 %	0.01 %	0.05	-0.23	0.09 %	0.02 %	-0.61	-0.56	0.33 %
-6	-0.05 %	-0.96	-0.53	0.22 %	-0.06 %	-1.15	-1.32	0.03 %	-0.07 %	-0.80	-0.43	0.26 %
-5	0.04 %	0.75	0.58	0.26 %	-0.06 %	-1.22	-1.19	-0.03 %	-0.01 %	-0.14	0.36	0.25 %
-4	-0.01 %	0.30	0.92	0.25 %	0.10 %	1.35	1.51	0.07 %	0.01 %	0.34	0.30	0.26 %
-3	0.08 %	1.44	0.89	0.33 %	0.15 %	**2.86****	**2.23***	0.22 %	0.17 %	1.39	**2.21***	0.43 %
-2	0.08 %	0.15	0.10	0.41 %	0.14 %	**2.06***	1.92	0.36 %	0.08 %	0.42	0.36	0.51 %
-1	0.22 %	**3.01****	**3.06****	0.63 %	0.24 %	**3.76****	**3.21****	0.60 %	0.03 %	0.96	1.38	0.54 %
0	0.57 %	**9.34****	**2.73****	1.20 %	0.05 %	0.35	-0.03	0.65 %	-1.84 %	**-26.7****	**-8.48****	-1.30 %
1	0.32 %	**3.77****	**2.32***	1.52 %	0.21 %	**3.59****	**2.49***	0.86 %	0.13 %	0.76	0.25	-1.17 %
2	0.05 %	0.96	0.84	1.57 %	0.04 %	0.76	-0.05	0.90 %	-0.01 %	-1.00	-1.16	-1.18 %
3	0.11 %	1.30	1.02	1.68 %	-0.07 %	-0.93	-0.95	0.83 %	-0.15 %	-1.71	-1.31	-1.33 %
4	-0.06 %	-0.24	-0.77	1.62 %	0.00 %	0.31	-0.50	0.83 %	0.02 %	0.02	-1.03	-1.31 %
5	-0.07 %	-0.68	-0.03	1.55 %	-0.11 %	**-1.99***	**-2.36***	0.72 %	0.01 %	-0.41	-0.55	-1.30 %
6	0.05 %	0.39	1.24	1.60 %	-0.11 %	**-1.99***	**-2.29***	0.61 %	0.06 %	0.36	-0.26	-1.24 %
7	0.04 %	0.89	0.40	1.64 %	-0.03 %	-0.11	-0.21	0.58 %	-0.12 %	-1.78	**-2.00***	-1.36 %
8	0.08 %	0.30	0.26	1.72 %	-0.01 %	-0.08	-0.32	0.57 %	-0.03 %	-0.36	-1.24	-1.39 %
9	0.07 %	0.44	0.16	1.79 %	-0.10 %	-1.93	**-2.43***	0.47 %	-0.04 %	-0.58	-0.98	-1.43 %
10	0.03 %	0.21	0.24	1.82 %	-0.12 %	-1.95	**-2.38***	0.35 %	-0.01 %	0.40	0.52	-1.44 %

* and ** present 1% and 5% confidence levels respectively

Good News -category has the most significant (1% level in Patel-test and GRANK-test) abnormal earnings of 0.57% on the event day as the positive news reach the investors. The information is incorporated into prices also on the next day with abnormal earnings value of 0.32% which is significant on 1% level in Patell-test and 5% level in GRANK-

test. However, also one day before the event has significant values on 1% level in both tests of 0.22% which would either imply that part of the information has leaked or that the investors bet positive in the bull markets before earnings announcements. No News is a different story; event day does not carry significant abnormal returns as theory suggests but third and first day before the event are significant on 1% level in both tests resulting 0.15% and 0.24% abnormal earnings respectively. This gives credit to the assumption that investors are betting for positive news before the announcements as it happened in both categories. Additionally, as the information is incorporated in, fifth and sixth day are significant on 5% level in both tests both having negative abnormal earnings of 0.11% which could be interpreted as a stock price correction. Bad news is highly significant on event day resulting negative abnormal earnings of -1.84% which makes perfect sense. However, the drift seems to dilute straight away; no significant values occur after the event.

Table 5 presents CAARs for Full sample between different intervals in order to find out statistically significant drift.

Table 5. CAARs and significance tests for Full sample around event period

		[0;1]	[1;2]	[1;3]	[2;5]	[2;10]
GOOD NEWS	CAAR	0.89 %	0.36 %	0.47 %	0.03 %	0.29 %
564	Adj. Patel Z	**10.08****	**3.62****	**3.77****	0.19	1.29
Observations	GRANK Z	**3.76****	**2.12***	**3.77****	1.40	0.62
NO NEWS	CAAR	0.26 %	0.26 %	0.19 %	-0.13 %	-0.50 %
691	Adj. Patel Z	**2.48***	**2.72****	1.75	-1.73	**-2.33***
Observations	GRANK Z	1.68	**2.42***	1.57	-0.31	**-3.29****
BAD NEWS	CAAR	-1.71 %	0.12 %	-0.03 %	-0.14 %	-0.29 %
414	Adj. Patel Z	**-18.01****	-0.16	-1.10	**-2.07***	-1.65
Observations	GRANK Z	**-7.28****	-0.54	-1.11	-1.80	-1.87

* and ** present 1% and 5% confidence levels respectively

As figure 5 and table 4 implied, Good News has statistically significant drift from the event day to first day after the event and also from first to second and third days after the event on 1% level (except on 5% level in GRANK-test from day one to day two). For No News, the significant abnormal returns occur from day one to day two after the

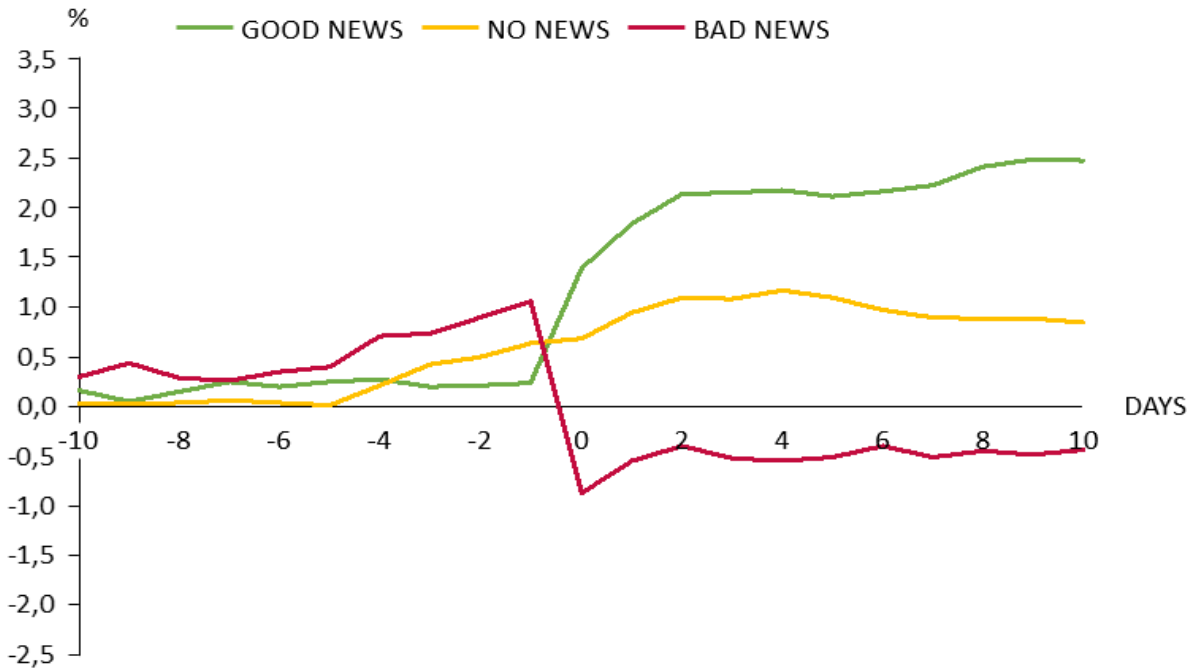
event (0.26% on 1% level in Patell and 1% in GRANK) and negative from day two to day ten after the event (-0.5% on 5% level in Patell and 1% level in GRANK). For Bad News the only significant observation interval is from event day to first day after the event which is significant on 1% level in both tests resulting abnormal earnings of -1.71%. However, the table 4 shows that first day after the event is actually positive which means that highly significant values of event day also drags this observation interval on the significant level.

5.2 PEAD in Nasdaq HELSINKI 2009-Q2/2017 Large Cap vs Mid&Small Cap

5.2.1 Large Cap

Large Cap -group consists of 798 observations which from 243 are categorized as good news, 374 as no news and 181 as bad news. Figure 6 shows how stock prices behave 10 days before and 10 days after event date.

Figure 6. Post earnings announcement drift for Large Cap



Good News seems to be walking random walk before event date but once positive earnings surprise occur, stock price starts climbing for the next two days settling down after that. No News seems to be gathering positive expectations before event date and slight increase after the event but relatively random walk in general. Bad News climbs before event date but experiences vast fall when negative news occur. Slight rebound occurs for the next few days and relatively steady behavior for the last days of the study period.

Table 6 presents average abnormal returns and cumulated average abnormal returns and their significance which was measured by adjusted Patell-test and Generalized Rank test.

Table 6. AARs, CAARs and significance tests for Large Cap in [-10;10] days around event date

t	GOOD NEWS				NO NEWS				BAD NEWS			
	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR
-10	0.16 %	0.88	0.79	0.16 %	0.02 %	0.64	0.77	0.02 %	0.29 %	**2.39***	**3.46****	0.29 %
-9	-0.11 %	-0.74	-0.70	0.05 %	0.00 %	-0.07	-0.39	0.02 %	0.14 %	1.13	0.63	0.43 %
-8	0.09 %	0.42	0.74	0.14 %	0.01 %	-0.56	-0.02	0.03 %	-0.15 %	-0.62	0.04	0.28 %
-7	0.10 %	0.56	0.12	0.24 %	0.03 %	0.11	-0.17	0.06 %	-0.02 %	-0.72	-0.14	0.26 %
-6	-0.05 %	-0.23	0.12	0.19 %	-0.03 %	-0.65	-0.70	0.03 %	0.09 %	0.77	0.72	0.35 %
-5	0.06 %	0.76	0.37	0.25 %	-0.02 %	-0.37	-0.27	0.01 %	0.05 %	1.11	0.89	0.40 %
-4	0.02 %	0.99	1.09	0.27 %	0.20 %	1.80	**2.03***	0.21 %	0.30 %	**2.73****	**2.3***	0.70 %
-3	-0.07 %	-0.09	-0.26	0.20 %	0.21 %	**2.63****	**2.29***	0.42 %	0.03 %	-0.19	0.43	0.73 %
-2	0.00 %	-0.54	-0.52	0.20 %	0.08 %	0.89	0.92	0.50 %	0.16 %	0.86	0.61	0.89 %
-1	0.03 %	0.45	1.05	0.23 %	0.13 %	1.83	1.37	0.63 %	0.16 %	1.54	1.55	1.05 %
0	1.16 %	**12.84****	**4.21****	1.39 %	0.05 %	-0.43	-0.28	0.68 %	-1.93 %	**-20.31****	**-5.92****	-0.88 %
1	0.45 %	**3.56****	**2.99****	1.84 %	0.27 %	**3.59****	**2.5***	0.95 %	0.32 %	**2.41***	1.42	-0.56 %
2	0.30 %	**2.8****	**2.72****	2.14 %	0.15 %	1.71	0.70	1.10 %	0.15 %	0.32	0.04	-0.41 %
3	0.01 %	0.33	0.49	2.15 %	-0.02 %	0.01	0.41	1.08 %	-0.12 %	-0.33	-0.59	-0.53 %
4	0.03 %	0.82	-0.05	2.18 %	0.09 %	1.23	0.87	1.17 %	-0.02 %	-0.35	-0.97	-0.55 %
5	-0.07 %	-0.33	0.09	2.11 %	-0.08 %	-1.52	-1.88	1.09 %	0.03 %	-0.03	-0.27	-0.52 %
6	0.05 %	0.76	0.90	2.16 %	-0.12 %	-1.74	**-2.39***	0.97 %	0.12 %	0.83	0.32	-0.40 %
7	0.07 %	0.74	0.26	2.23 %	-0.08 %	-0.54	-0.56	0.89 %	-0.12 %	-1.26	-1.50	-0.52 %
8	0.18 %	0.78	0.17	2.41 %	-0.01 %	0.07	-0.52	0.88 %	0.06 %	0.28	-0.05	-0.46 %
9	0.08 %	0.07	0.02	2.49 %	0.00 %	-0.48	-1.14	0.88 %	-0.03 %	-0.51	-0.98	-0.49 %
10	-0.01 %	-0.54	-0.27	2.48 %	-0.04 %	-0.66	-0.54	0.84 %	0.05 %	0.97	0.85	-0.44 %

* and ** present 1% and 5% confidence levels respectively

Good news shows significant abnormal returns of 1.16%, 0.45% and 0.3% on 1% level for 0,1 and 2 days respectively around the event, following 8 days of insignificant values for both, adjusted Patell and GRANK -test. No news -category carries insignificant values for event day but for day 1, it has positive abnormal return of 0.27% in day 1 in 1% significance level in Patell-test and 5% level in GRANK-test. This could be due to investors further analyzing the interim report and acting based on good future prospects. Additionally, day 3 has positive result of 0.2% in significance level of 1% in Patell and 5% in GRANK. Bad news -category has negative abnormal return of -1.93% on event day on 1% level in both significance tests following 9 days of insignificant values which implies that investors react to negative news relatively fast. Additionally, Bad news has abnormal return of 0.29% and 0.3% on days -10 and -4 which are significant on 5% and 1% in Patell-test and 1% and 5% in GRANK -test respectively.

None of the categories has significant values for days -1 or -2 which implies that information has not come available to markets before event day. However, both No News and Bad News had positive abnormal returns few days before the event day but Good News did not. This might imply that investors have betted for positive news rather than negative or in line with consensus.

Table 7 shows CAARs between different dates in order to find out whether there has been statistically significant drift

Table 7. CAARs and significance tests for Large Cap around event period

		[0;1]	[1;2]	[1;3]	[2;5]	[2;10]
GOOD NEWS	CAAR	1.62 %	0.75 %	0.76 %	0.27 %	0.64 %
243	Adj. Patel Z	**13.5****	**5.23****	**4.49****	**2.1***	**2.1***
Observations	GRANK Z	**5.05****	**3.72****	**3.48****	1.33	1.13
NO NEWS	CAAR	0.32 %	0.43 %	0.41 %	0.15 %	-0.10 %
374	Adj. Patel Z	**1.98***	**3.3****	**2.7****	0.63	-0.56
Observations	GRANK Z	1.39	**2.95****	**2.8****	0.24	-0.82
BAD NEWS	CAAR	-1.61 %	0.47 %	0.35 %	0.04 %	0.11 %
181	Adj. Patel Z	**-12.08****	1.84	1.32	-0.19	-0.02
Observations	GRANK Z	**-4.47****	1.13	0.88	-0.43	-0.28

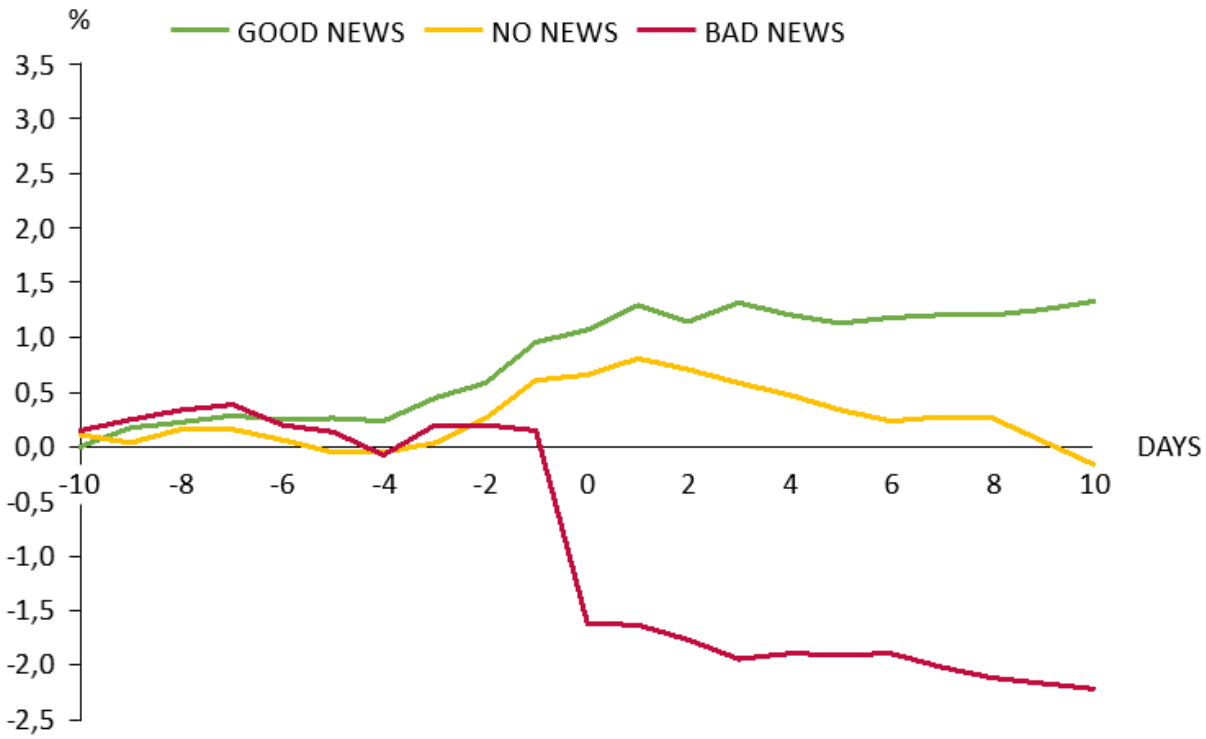
* and ** present 1% and 5% confidence levels respectively

For Good news, it seems that all information has not been incorporated to stock price on the event date. Drift occurs from first to second date and first to third date with abnormal returns of 0.75% and 0.76% respectively in 1% significance in both Patell and GRANK -tests. However, drift mends away after second day as observation periods from second to fifth day and from second to tenth day do not offer significant abnormal results. This is in line with figure 6 which visualized steady behavior of stock price after second day after event day. No News does not carry significant values from event day to first day after event day but from first to second and first to third are statistically significant in both tests which was noted earlier. Neither significant values exists for No News drift from second to fifth and second to tenth days after event period. No drift exists in Large cap for Bad News; it seems that all the earnings surprise information is incorporated in the event day and even though observation period from event day to first day is significant, table 6 shows that first day actually has positive abnormal result which is only significant in 5% level in Patell-test which could be explained by outlier values on the first date in cases where stock price has been rebounded in some observations as the GRANK-test shows insignificant value.

5.2.2 Mid&Small Cap

Mid&Small Cap –group consists of 871 observations form which Good News, No News and Bad News have 321, 317 and 233 observations respectively. Figure 7 shows stock price behavior after 10 days before and 10 days after event day.

Figure 7. Post earnings announcement drift for Mid&Small Cap



Good news has a rising trend in Mid&Small but it is starting already four days before event day which might imply that surprise news have broken before the announcement date. Drift mends on the first day after announcement and continues on that level the next nine days. No News starts rising three days before announcement day but decreasing trend starts one day after announcement. Bad News stock behavior seems relatively random before announcement date but experiences large drop when news break out. The decrease continues even after the announcement date.

Table 8 shows average abnormal returns and cumulated average abnormal returns for Mid&Small cap -companies and significance which was measured by adjusted Patell-test and Generalized Rank test.

Table 8. AARs, CAARs and significance tests for Mid & Small Cap in [-10;10] days around event date

t	GOOD NEWS				NO NEWS				BAD NEWS			
	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR
-10	0.00 %	-0.04	-0.34	0.00 %	0.11 %	1.04	1.05	0.11 %	0.14 %	1.22	1.05	0.14 %
-9	0.17 %	1.38	0.49	0.17 %	-0.08 %	-1.29	-0.25	0.03 %	0.11 %	1.19	0.88	0.25 %
-8	0.05 %	0.81	0.35	0.22 %	0.13 %	1.31	1.58	0.16 %	0.08 %	0.16	0.79	0.33 %
-7	0.06 %	0.42	0.33	0.28 %	0.00 %	-0.05	-0.18	0.16 %	0.05 %	-0.19	-0.86	0.38 %
-6	-0.04 %	-1.07	-0.80	0.24 %	-0.10 %	-0.99	-1.17	0.06 %	-0.19 %	-1.75	-1.20	0.19 %
-5	0.02 %	0.33	0.44	0.26 %	-0.11 %	-1.40	-1.64	-0.05 %	-0.06 %	-1.17	-0.34	0.13 %
-4	-0.03 %	-0.47	0.26	0.23 %	-0.01 %	0.04	0.01	-0.06 %	-0.21 %	-1.95	-1.65	-0.08 %
-3	0.21 %	**1.99***	1.45	0.44 %	0.09 %	1.36	0.98	0.03 %	0.27 %	**2.01***	**2.54***	0.19 %
-2	0.14 %	0.67	0.58	0.58 %	0.22 %	**2.07***	1.86	0.25 %	0.01 %	-0.20	-0.05	0.20 %
-1	0.37 %	**3.58****	**3.09****	0.95 %	0.36 %	**3.56****	**3.29****	0.61 %	-0.06 %	-0.08	0.57	0.14 %
0	0.12 %	1.20	-0.30	1.07 %	0.05 %	0.98	0.27	0.66 %	-1.77 %	**-17.69****	**-6.14****	-1.63 %
1	0.22 %	1.91	0.44	1.29 %	0.14 %	1.40	0.86	0.80 %	-0.01 %	-1.11	-0.91	-1.64 %
2	-0.15 %	-1.16	-1.24	1.14 %	-0.09 %	-0.73	-0.80	0.71 %	-0.14 %	-1.61	-1.61	-1.78 %
3	0.18 %	1.44	0.90	1.32 %	-0.13 %	-1.38	-1.69	0.58 %	-0.17 %	-1.98*	-1.28	-1.95 %
4	-0.12 %	-1.03	-0.96	1.20 %	-0.11 %	-0.87	-1.69	0.47 %	0.05 %	0.34	-0.54	-1.90 %
5	-0.07 %	-0.61	-0.16	1.13 %	-0.14 %	-1.29	-1.49	0.33 %	-0.01 %	-0.53	-0.48	-1.91 %
6	0.05 %	-0.15	0.83	1.18 %	-0.10 %	-1.04	-0.93	0.23 %	0.01 %	-0.25	-0.60	-1.90 %
7	0.02 %	0.53	0.36	1.20 %	0.04 %	0.43	0.43	0.27 %	-0.12 %	-1.26	-1.34	-2.02 %
8	0.00 %	-0.28	0.18	1.20 %	-0.01 %	-0.19	0.13	0.26 %	-0.10 %	-0.72	-1.50	-2.12 %
9	0.06 %	0.52	0.17	1.26 %	-0.21 %	**-2.34***	**-2.28***	0.05 %	-0.05 %	-0.33	-0.50	-2.17 %
10	0.07 %	0.76	0.53	1.33 %	-0.22 %	**-2.16***	**-2.87****	-0.17 %	-0.06 %	-0.32	0.03	-2.23 %

* and ** present 1% and 5% confidence levels respectively

Good news does not have any significant abnormal returns in or after the announcement date and the only significant value (0.37%, on 1% level in both tests) can be found one day before announcement date. No news has also significant abnormal returns in both tests one day before the announcement date might suggest that interpretation of earnings surprise news breaking out one day before announcement date in Good news was wrong and it is actually investors' behavior to bet positive before announcements especially in bull markets. Additionally, No news has negative significant values on 5% level (-0.21% and -0.22%) for ninth and tenth days respectively after the announcement. Bad news has -1.77% abnormal return on 1% significance level in both tests but no single significant dates after the announcement. However, three days before announcement date has positive abnormal return in 5% level in both tests for third day before announcement.

Table 9 shows CAARs in Mid&Small Cap -group between different dates in order to find out whether there has been statistically significant drift

Table 9. CAARs and significance tests for Mid&Small Cap around event period

		[0;1]	[1;2]	[1;3]	[2;5]	[2;10]
GOOD NEWS	CAAR	0.34 %	0.07 %	0.25 %	-0.16 %	0.04 %
321	Adj. Patel Z	2.17*	0.52	1.24	-0.67	0.01
Observations	GRANK Z	0.46	-0.47	0.39	-0.70	0.02
NO NEWS	CAAR	0.19 %	0.06 %	-0.07 %	-0.46 %	-0.97 %
317	Adj. Patel Z	1.49	0.42	-0.36	-1.89	-2.82**
Observations	GRANK Z	0.87	0.35	-0.72	-2.58*	-1.96*
BAD NEWS	CAAR	-1.78 %	-0.15 %	-0.33 %	-0.28 %	-0.59 %
233	Adj. Patel Z	-13.6**	-1.97*	-2.78**	-1.94	-2.27*
Observations	GRANK Z	-5.74**	-1.73	-2.26*	-2.18*	-2.78**

* and ** present 1% and 5% confidence levels respectively

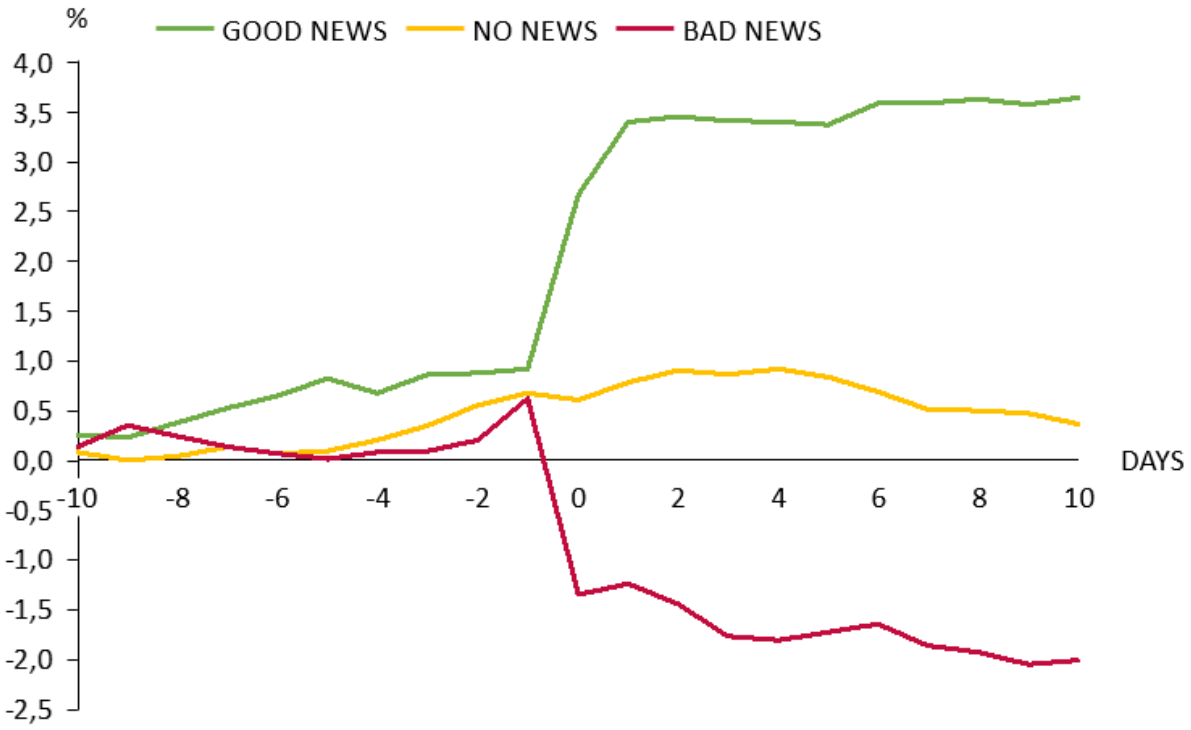
Good news does not have single observation period with significant values. The closest is from announcement date to day one, which is significant in 5% level in Patell-test but not close to significant in GRANK-test which occurs when a few of the Good News -observations have had a large price reaction but in general, stock prices have not experienced drifts based on abnormal earnings signal. For No News, only significant period (1% in Patell, 5% in GRANK) is from second day to tenth day after the announcement day but it has negative value of -0.97% which could be interpreted as correction on the price level for the speculation which occurred few days before the announcement date. Bad news is significant on 1% level in both tests from announcement day to day one resulting negative abnormal earnings of -1.78%. Additionally, in Mid&Small Cap –group, drift is significant from day one to day three and day two to day ten after the announcement date (1% Patell, 5% GRANK and 5% Patell, 5% GRANK respectively) resulting negative abnormal earnings of -0.15% for former and -0.59% for latter.

5.3 PEAD in Nasdaq HELSINKI 2009-Q2/2017 Winners vs Losers

5.3.1 Winners

Winners -group consists of 635 observations which from 194 are categorized as Good News, 296 as No News and 145 as Bad News. Figure 7 shows how stock prices behave 10 days before and 10 days after event date.

Figure 7. Post earnings announcement drift for Winners



All of the categories seems to be acting relatively random before the event date. When positive news outbreak, Good news jumps up but increase dilutes after day one. No News does not experience any jumps or falls based on the picture but as earlier, Bad News drops dramatically when negative earnings information comes public.

Additionally, it looks like the drift continues for the next ten days after negative earnings surprise has broken out.

Table 10 shows average abnormal returns and cumulated average abnormal returns for Mid&Small cap -companies and significance which was measured by adjusted Patell-test and Generalized Rank test.

Table 10. AARs, CAARs and significance tests for Winners in [-10;10] days around event date

t	GOOD NEWS				NO NEWS				BAD NEWS			
	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR
-10	0.25 %	1.45	1.38	0.25 %	0.08 %	1.35	1.38	0.08 %	0.14 %	1.41	**2.28***	0.14 %
-9	-0.02 %	0.01	-0.44	0.23 %	-0.08 %	-1.22	-0.93	0.00 %	0.21 %	1.20	1.08	0.35 %
-8	0.15 %	0.79	0.96	0.38 %	0.04 %	-0.01	0.42	0.04 %	-0.11 %	-0.35	-0.05	0.24 %
-7	0.15 %	0.67	0.46	0.53 %	0.09 %	0.64	0.45	0.13 %	-0.10 %	-0.59	-0.50	0.14 %
-6	0.12 %	0.90	0.64	0.65 %	-0.06 %	-0.70	-1.09	0.07 %	-0.07 %	-0.34	-0.37	0.07 %
-5	0.17 %	1.85	1.16	0.82 %	0.03 %	0.15	0.62	0.10 %	-0.05 %	-0.14	-0.19	0.02 %
-4	-0.14 %	-0.54	-0.45	0.68 %	0.10 %	0.79	0.71	0.20 %	0.06 %	0.80	0.70	0.08 %
-3	0.18 %	1.49	1.24	0.86 %	0.15 %	1.74	1.39	0.35 %	0.02 %	-0.24	0.39	0.10 %
-2	0.02 %	-0.82	-0.81	0.88 %	0.21 %	1.80	1.36	0.56 %	0.10 %	0.59	0.37	0.20 %
-1	0.04 %	0.54	0.83	0.92 %	0.11 %	1.00	0.59	0.67 %	0.42 %	**3.49****	**3.05****	0.62 %
0	1.75 %	**15.5****	**4.91****	2.67 %	-0.06 %	-1.34	-0.40	0.61 %	-1.97 %	**-17.63****	**-4.93****	-1.35 %
1	0.74 %	**4.93****	**3.37****	3.41 %	0.17 %	1.50	0.80	0.78 %	0.11 %	0.56	0.03	-1.24 %
2	0.05 %	0.48	0.42	3.46 %	0.12 %	0.90	-0.13	0.90 %	-0.21 %	-1.48	-1.53	-1.45 %
3	-0.04 %	-0.29	0.21	3.42 %	-0.04 %	-0.21	-0.14	0.86 %	-0.32 %	**-2.48***	**-2.32***	-1.77 %
4	-0.01 %	0.17	-0.38	3.41 %	0.06 %	0.52	-0.16	0.92 %	-0.04 %	-0.21	-0.79	-1.81 %
5	-0.03 %	0.15	0.42	3.38 %	-0.08 %	-1.46	-1.78	0.84 %	0.08 %	0.65	0.93	-1.73 %
6	0.21 %	1.48	**2.15***	3.59 %	-0.15 %	**-2.02***	**-2.86****	0.69 %	0.08 %	0.50	0.17	-1.65 %
7	0.00 %	0.17	-0.34	3.59 %	-0.17 %	-1.66	**-2.04***	0.52 %	-0.21 %	**-2.12***	-1.93	-1.86 %
8	0.05 %	-0.28	-0.78	3.64 %	-0.02 %	0.17	-0.03	0.50 %	-0.07 %	-0.68	-1.01	-1.93 %
9	-0.06 %	-0.96	-1.25	3.58 %	-0.03 %	-1.23	-1.66	0.47 %	-0.12 %	-1.08	-1.88	-2.05 %
10	0.07 %	0.05	-0.11	3.65 %	-0.11 %	-1.05	-1.11	0.36 %	0.03 %	0.62	0.72	-2.02 %

* and ** present 1% and 5% confidence levels respectively

Event day and first day after the event are both highly significant (1% level in both tests) in Good News and result 1.75% and 0.74% abnormal returns respectively. No other single significant days exist for Good News. For No News, only significant day is sixth after the event (5% Patell-test, 1% GRANK-test) with negative abnormal return of 0.15%. Bad News carry significant values on day before the event (0.48%) and on the event day (-1.97%) on 1% level in both tests. As seen earlier, it seems that market are

betting for positive news before the announcement but disappointing when negative earnings surprise comes out which further accelerates the drop on the event day. Additionally, third day after the event carries significant value of -0.32% on 5%.

Table 11 presents CAARs for Winners-group between different intervals in order to find out statistically significant drift.

Table 11. CAARs and significance tests for Winners around event period

		[0;1]	[1;2]	[1;3]	[2;5]	[2;10]
GOOD NEWS	CAAR	2.49 %	0.80 %	0.76 %	-0.02 %	0.25 %
194	Adj. Patel Z	**15.75****	**4.17****	**3.22****	0.28	0.35
Observations	GRANK Z	**5.62****	**2.81****	**2.47***	-0.08	-0.05
NO NEWS	CAAR	0.11 %	0.29 %	0.25 %	0.06 %	-0.42 %
296	Adj. Patel Z	0.09	1.38	1.03	-0.10	-1.63
Observations	GRANK Z	0.28	1.32	1.33	-0.61	**-2.49***
BAD NEWS	CAAR	-1.86 %	-0.10 %	-0.42 %	-0.48 %	-0.78 %
145	Adj. Patel Z	**-12.78****	-0.69	**-2.08***	-1.87	**-2.22***
Observations	GRANK Z	**-4.02****	-0.61	-1.54	**-2.27***	**-3.03****

* and ** present 1% and 5% confidence levels respectively

Good News carry a significant values in both tests for three first observation intervals on 1% level in both tests with exception of 5% level from day one to day three (2.49%, 0.8% and 0.76% respectively) in GRANK-test. It appears that the most of the information is incorporated into prices on event day but also day one offers slight drift. However, against the results in Table 11, Table 10 shows that because of single value of first day after the event is so significant, it drags also observation intervals to be significant. This can be also interpreted from second to fifth and tenth day intervals which are not close to significant. No News does not carry any significant values for any of the observation interval. The closest is from day two to day ten which is significant on 5% level in GRANK-test but not even 10% level in Patell-test. Bad News carries the same trend as previous categories; the observation interval from event day to day one is highly significant but in reality, it is affected by event day's high values and as table 10 shows, day 1 is not significant. However, observation interval from day two to day ten is significant in 5% level in Patell-test and 1% level in GRANK-test. This

implies that negative drift occurs for Winners after the negative earnings surprise news information has been incorporated.

5.3.2 Losers

Losers-group consists of 278 observations which from 163 are categorized as Good News, 81 as No News and 64 as Bad News. Figure 8 shows how stock prices behave 10 days before and 10 days after the event date.

Figure 8. Post earnings announcement drift for Losers

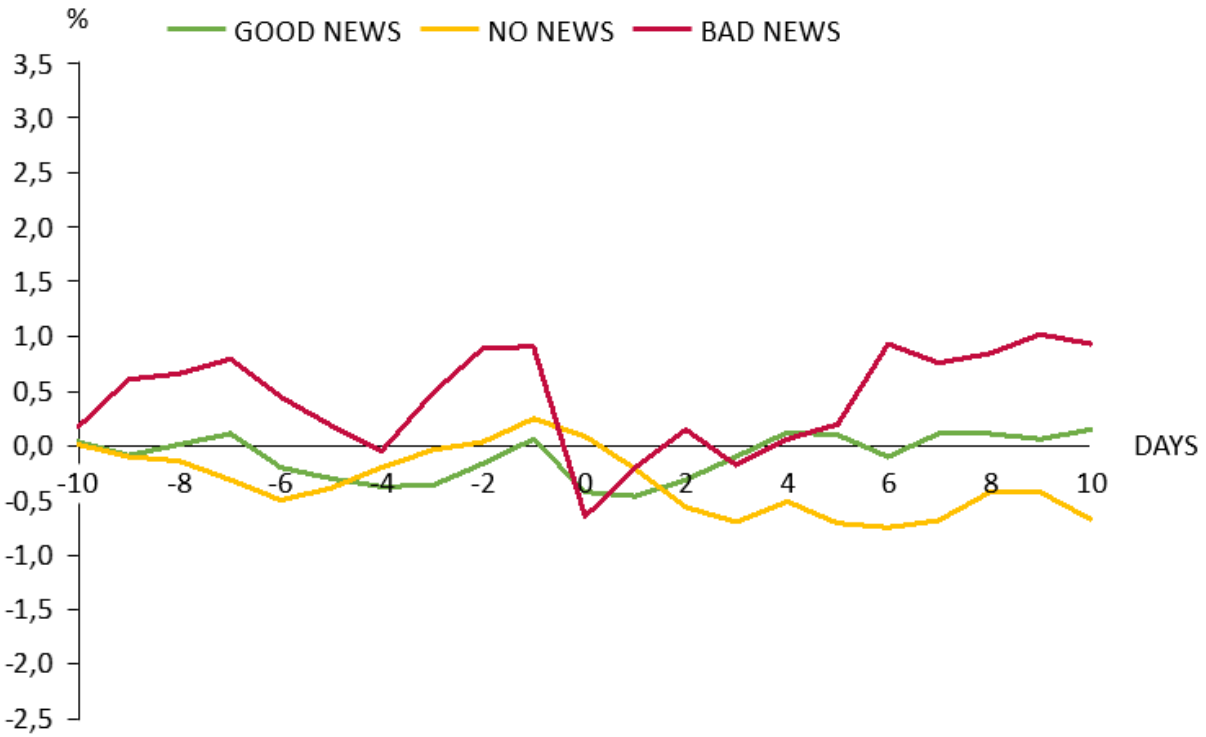


Figure 8 differs from other earlier presented figures vastly and no clear patterns can be found. Good News does not seem to react in any way to positive news and walks randomly around the starting stock price through observation period. No News faces a slight drop on event day which seems to be continuing a few days and balancing thereafter. Bad News experiences a drop on event day which gives creditability to data

classification but it rebounds on the next two days and continues to rise resulting higher level on day ten after the event that it was before.

Table 10 shows average abnormal returns and cumulated average abnormal returns for Losers and significance which was measured by adjusted Patell-test and Generalized Rank test.

Table 12. AARs, CAARs and significance tests for Losers in [-10;10] days around event date

t	GOOD NEWS				NO NEWS				BAD NEWS			
	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR	AAR	Adj. Patel Z	GRANK Z	CAAR
-10	0.03 %	0.34	-0.22	0.03 %	0.01 %	-0.35	-0.42	0.01 %	0.17 %	0.63	0.38	0.17 %
-9	-0.12 %	-0.79	-1.28	-0.09 %	-0.11 %	-0.97	-1.74	-0.10 %	0.44 %	1.84	1.42	0.61 %
-8	0.10 %	0.45	0.04	0.01 %	-0.04 %	-0.62	0.01	-0.14 %	0.04 %	0.10	0.48	0.65 %
-7	0.10 %	0.52	0.00	0.11 %	-0.18 %	-1.61	-1.84	-0.32 %	0.14 %	-0.05	0.10	0.79 %
-6	-0.31 %	**-2.3***	-1.80	-0.20 %	-0.18 %	-0.78	-1.31	-0.50 %	-0.34 %	-0.86	-1.66	0.45 %
-5	-0.10 %	-0.54	-0.12	-0.30 %	0.11 %	-0.20	-0.39	-0.39 %	-0.27 %	-1.43	-0.15	0.18 %
-4	-0.08 %	-0.46	-0.17	-0.38 %	0.18 %	0.57	0.93	-0.21 %	-0.23 %	-0.94	-1.09	-0.05 %
-3	0.01 %	0.66	-0.39	-0.37 %	0.17 %	0.93	0.62	-0.04 %	0.53 %	1.78	**2.8****	0.48 %
-2	0.20 %	1.00	0.80	-0.17 %	0.07 %	0.49	-0.05	0.03 %	0.41 %	1.46	1.82	0.89 %
-1	0.23 %	1.27	1.57	0.06 %	0.22 %	1.16	1.53	0.25 %	0.01 %	0.02	0.39	0.90 %
0	-0.49 %	**-2.15***	-1.35	-0.43 %	-0.17 %	**-2.37***	-1.03	0.08 %	-1.55 %	**-9.36****	**-3.37****	-0.65 %
1	-0.04 %	-0.59	-0.74	-0.47 %	-0.30 %	-1.27	-1.28	-0.22 %	0.44 %	1.31	0.44	-0.21 %
2	0.15 %	1.13	1.06	-0.32 %	-0.35 %	-1.56	-1.43	-0.57 %	0.36 %	0.83	0.57	0.15 %
3	0.22 %	1.76	0.90	-0.10 %	-0.13 %	-0.60	-0.91	-0.70 %	-0.33 %	-1.24	-0.93	-0.18 %
4	0.22 %	1.54	1.59	0.12 %	0.18 %	**2.16***	1.26	-0.52 %	0.24 %	1.32	1.08	0.06 %
5	-0.03 %	0.14	-0.12	0.09 %	-0.20 %	-0.91	-1.49	-0.72 %	0.14 %	-0.05	0.57	0.20 %
6	-0.20 %	-1.36	-0.78	-0.11 %	-0.03 %	-0.55	-0.67	-0.75 %	0.73 %	**2.74****	**2.61****	0.93 %
7	0.22 %	1.62	1.46	0.11 %	0.06 %	1.29	1.33	-0.69 %	-0.18 %	-0.39	-0.39	0.75 %
8	0.00 %	-0.55	-0.73	0.11 %	0.26 %	1.39	1.44	-0.43 %	0.09 %	0.37	0.39	0.84 %
9	-0.05 %	-0.57	-0.91	0.06 %	0.00 %	-0.03	-0.43	-0.43 %	0.18 %	0.92	1.12	1.02 %
10	0.08 %	0.66	0.94	0.14 %	-0.25 %	-1.49	**-2.38***	-0.68 %	-0.09 %	0.09	-0.04	0.93 %

* and ** present 1% and 5% confidence levels respectively

As figure 8 implied, no single day significant values can be found for Good News. The same applies for No News. However, Bad News is significant on the event day resulting -1.55% negative abnormal earnings on 1% significance level in both tests.

Table 13 presents CAARs for Losers-group between different intervals in order to find out statistically significant drift.

Table 13. CAARs and significance tests for Losers around event period

		[0;1]	[1;2]	[1;3]	[2;5]	[2;10]
GOOD NEWS	CAAR	-0.53 %	0.12 %	0.34 %	0.56 %	0.15 %
163	Adj. Patel Z	-2.02*	0.40	1.39	**2.39***	0.40
Observations	GRANK Z	-1.24	0.02	0.97	**2.21***	0.15
NO NEWS	CAAR	-0.48 %	-0.65 %	-0.78 %	-0.51 %	-0.71 %
81	Adj. Patel Z	**-2.39***	-1.86	-1.84	-0.42	-1.08
Observations	GRANK Z	-1.15	-1.35	-1.87	-1.00	-1.28
BAD NEWS	CAAR	-1.11 %	0.80 %	0.47 %	0.41 %	0.94 %
64	Adj. Patel Z	**-5.95****	1.59	0.55	0.45	-0.20
Observations	GRANK Z	**-3.25****	0.32	0.00	0.49	0.08

* and ** present 1% and 5% confidence levels respectively

Good News shows statistically significant (5% level in both tests) drift of 0.56% from second day to fifth day after the event which looks like a correction to negative drop on the event day. No News does not carry any significant values in observation intervals as the prices tend to stay on the level they were before the event. Bad News has significant value from event day to day one after the event on 1% level in both tests but table 12 shows that actually the reaction to negative earnings surprise is so powerful on event day that it drags the interval to be significant because day on after the event is actually positive without significant values.

5.4 Discussion and future research

Large Cap and Mid&Small Cap –groups both had increasing trends for Good News but in Large Cap, increase started on the event date and continued after it whereas for Mid&Small Cap, most of the increase took place before the event. Significance tests on the tables 6, 7, 8 and 9 verify the results on figures 6 and 7: for Large Cap the post earnings announcement drift occurs for the next two days after the event but for Mid&Small Cap, no such phenomenon exists in Good News. Large Cap and Mid&Small Cap have increasing pattern in No News before the event but for Mid&Small Cap,

abnormal earnings balance before the end of observation period whereas in Large Cap, increasing trend continues for a few days and balances after that. Against the presumptions, Large Cap carries significant values for two days after the event date which implies that interim reports have had other important information than earnings as a base for new valuation after the earnings announcements. Regarding Mid&Small Cap, no significant post earnings announcement drift can be identified for observation period except from day two to day ten after the event but as concluded earlier, it is rather a balancing move to high expectations before the event. For Bad News, Large and Mid&Small Caps have close to 2% negative abnormal earnings on event day but the most interesting difference can be seen here. For Large Cap, Bad News -category increases after the drop on the very next day whereas for Mid&Small Cap the trend is rather decreasing through the period. Significance tables confirm the results; for Large Cap, no significant PEAD can be found for the observation period but for Mid&Small Cap, drift continues through the period which implies that negative news are more effective for smaller companies.

Comparison on Winners versus Losers -groups gave interesting results stating that Winners experience vastly more controversial differences compared to Large versus Mid&Small Cap -comparison. When positive earnings announcement is given, abnormal earnings skyrocket for Winners but as for Losers, there is not any significant move to one way or the other. However, surprise is incorporated into prices relatively fast in Winners and second day after the event is already a negative which would imply that even though the news have great impact on earnings, no real post announcement drift occur. With No News one can see the same pattern as Large Cap versus Mid&Small Cap had; There is positive trend in abnormal earnings which continues a few days after the announcement in Winners but drops after the event in Losers. For Bad News, the only no drift exists as almost all of the information seems to be incorporating into prices on the very day the negative news break out.

As for the full data sample results, positive news are far more slowly incorporated into prices compared to negative surprise news. This is probably due to the investors taking

their time to analyze whether earnings are based on the better future prospects but as for Bad News, everybody knows that companies avoid them if possible. This leads to conclusion that Bad News carry far more significant earnings information versus Good News and thus it has steeper effect on curves. However, this creates a possibility for investor to enjoy the drift of positive surprise as investors are making their minds whether news are transparent and not one time deal.

Detailed comparison with earlier studies is rather difficult due to multiple different methods applied into post earnings announcements studies through the time which leads to joint hypothesis problem. Not only different models cause studies to be incomparable but also older studies have used completely different approach to forecast errors (time series versus analyst forecast) and studied longer drift whereas this study concentrates only to ten days drift after the announcement date. However, some similarities can be found. First, positive earnings surprises create positive abnormal earnings and negative earnings surprises create negative abnormal earnings as in all other studies. Second, almost everyone who formed the portfolio (Jones and Litzenberg, 1970 ; Bernard & Thomas, 1989 ; Booth et al, 1996 ; Vieru et al, 2005, Booth et al, 2006) had negative results in their short position when negative news broke and positive news when considering long position if news were positive. These findings are similar to this study which showed that negative news are incorporated significantly faster into prices compared to positive news. However, one must note that even if news are positive, drift is relatively small and does not last more than a few days at its best. Now that existence of weak PEAD in Nasdaq Helsinki has been confirmed for Good News in 2009-Q2/2017, some further research is needed to confirm the reasons for results, whether it actually benefits the investors and if analysts exploit PEAD. First, analyst behavior should be viewed through interviews in order to find out whether they even recognize the phenomenon in Finland and what the steps in their processes are when interim report comes out signaling either positive or negative earnings surprise. Additionally, the transactions which are done by robots should be identified as it might be that robots react to earnings fast and vast, which could explain steeper drop on event day when it comes to negative surprises. Additionally, as transactions happen

faster and faster based on better technology, PEAD should be studied based on trading hours on the event date rather than date, because now it is not transparent whether investors who trade one hour after the surprise could benefit from it and to what extent. If robots have significant role in trading around the event, one should also study excess volatility around and during the event date to get wider picture of behavior in Finland. In this study, sample split was done based on company size and whether company has performed better or worse compared to Nasdaq Helsinki index. These obviously are not the only categories that could be used for study; for example, one could study if there are industrial differences or if Finland's government's ownership has any influence to analyst behavior. As Large Cap Good News and No News -categories showed, drift might get additional power from CEOs views about the future and thus not only numbers should be viewed but also some kind of sentiment analysis about the information content of the publication.

6 CONCLUSION

The post earnings announcement drift is an anomaly that was first discovered by Ball and Brown (1968) and been nominated by Fama (1998) to granddaddy of all anomalies. The prior literature has discovered PEAD all around the world with different datasets and models and wide range of explanations has been offered but none of them gained the reputation of being complete. This study consists of 1671 observations between 2009 and 2017 which are then divided into two sub-categories based on the company size and performance on the markets. All results were relatively similar (adding robust to this study), information incorporated slower when news were positive compared to negative news confirming that information has transferred to prices in Nasdaq Helsinki between 2009 and 2017 relatively fast but PEAD still exists in some form.

Large companies seem to have longer drift compared to smaller companies but for negative news, smaller companies have just a slight drift whereas for large companies, prices actually start climbing up after the drop on the event date. Maybe the most significant finding was that there seems to be betting in some form before the event as prices tend to rise before the announcements (not significant drift patterns). This might imply that as we have had bull markets for almost whole observation period and interest rates have been historically low, investors are looking for opportunities to gain profits and place their capital even before the announcements.

Maybe the most significant finding in the study was differences in magnitude of PEAD in winners versus losers -comparison. Those companies who have performed lot worse than index, seem to be valuated not only by their accounting performance which would mean that if investor is thinking of exploiting PEAD, careful research should be performed before the decision. As for those companies, who have performed well compared to the index in observation period, seem to gain positive abnormal earnings just for having a good reputation. This resembles the gross profitability premium (Novy-Marx, 2013) which states that firms with higher profitability gain excess returns

compared to firms with low profitability. This seems to be rather fitting in today's financial and social culture, where startups come and go and presidential elections are won based on the hype.

APPENDIX

Data statistics for sample companies and list of excluded companies.

Appendix 1a. Statistics for Large Cap companies

Company	Winners/Loser	Observations	Standard deviation	Mean	Kurtosis	Skewness
Ahlstrom	Neutral	2317	1.89 %	0.01 %	5.70	0.12
Amer Sports A	Winner	2464	2.48 %	0.05 %	77.61	3.45
Cargotec	Winner	2464	6.09 %	0.14 %	1590.66	35.75
Citycon	Neutral	2464	2.84 %	-0.05 %	533.80	-15.73
DNA	Neutral	228	9.11 %	0.77 %	219.85	14.69
Fiskars	Neutral	2464	1.70 %	0.03 %	11.31	-0.05
Fortum	Loser	2464	2.02 %	-0.01 %	50.42	2.00
Huhtamäki	Winner	2464	2.42 %	0.09 %	249.10	8.89
Kemira	Winner	2464	2.28 %	0.02 %	11.37	-0.41
Kesko A	Neutral	2461	2.86 %	0.05 %	824.73	21.67
Kone	Winner	2464	3.49 %	0.00 %	1290.60	-30.53
Konecranes	Neutral	2464	3.14 %	0.00 %	251.27	-8.48
Metso	Winner	2464	3.57 %	0.06 %	500.30	14.90
Metsä Board A	Winner	2332	6.08 %	-0.07 %	1113.88	-27.70
Neste	Winner	2464	3.56 %	0.08 %	834.39	22.05
Nokia	Loser	2464	3.02 %	-0.09 %	65.48	-3.15
Nokian Renkaat	Winner	2464	3.75 %	0.08 %	674.77	18.84
Orion A	Neutral	2464	3.57 %	0.10 %	1415.42	32.72
Outokumpu	Loser	2464	3.55 %	-0.06 %	4.65	-0.08
Sampo A	Winner	2464	2.18 %	0.01 %	299.95	-10.45
Sponda	Winner	2464	2.88 %	0.04 %	456.46	14.25
Stora Enso R	Winner	2464	2.53 %	0.03 %	16.96	1.14
Tieto	Neutral	2464	2.46 %	0.05 %	133.72	6.13
UPM-Kymmene	Winner	2464	2.57 %	0.05 %	96.66	4.23
Valmet	Neutral	960	6.50 %	-0.11 %	797.60	-26.97
Wärtsilä	Winner	2464	5.61 %	0.14 %	1640.82	36.59

Appendix 1b. Statistics for Mid&Small Cap companies

Company	Winners/Loser	Observations	Standard deviation	Mean	Kurtosis	Skewness
Alma Media	Loser	2464	1.87 %	-0.03 %	13.92	-0.54
Apetit (LP)	Loser	2453	1.35 %	0.00 %	5.25	-0.35
Asiakastieto Group	Neutral	648	2.05 %	0.01 %	102.84	-6.00
Aspo (LP)	Neutral	2461	3.05 %	-0.04 %	1464.35	-33.62
Atria A	Neutral	2463	4.34 %	0.07 %	1581.38	35.58
Basware	Winner	2457	2.14 %	0.05 %	10.15	-0.27
Bittium	Winner	2464	7.13 %	-0.08 %	1652.64	-36.74
Caverion	Neutral	1087	8.24 %	-0.19 %	961.58	-30.08
Componenta	Loser	2398	4.41 %	-0.10 %	408.67	9.90
Consti Yhtiöt	Neutral	468	18.58 %	0.90 %	459.99	21.36
Cramo	Winner	2464	2.57 %	0.02 %	5.79	-0.05
Digia	Neutral	2445	5.86 %	-0.08 %	1802.54	-39.34
Etteplan (LP)	Neutral	2368	2.35 %	0.00 %	324.90	-10.82
Exel Composites	Neutral	2388	2.31 %	-0.01 %	13.78	0.57
Finnair	Neutral	2464	2.12 %	0.02 %	3.00	-0.09
F-Secure	Neutral	2464	4.78 %	-0.06 %	1528.57	-34.68
Glaston	Loser	2462	2.97 %	-0.09 %	17.29	-1.22
HKScan A	Loser	2464	6.59 %	0.08 %	1974.43	42.05
Honkarakenne B (LP)	Loser	2149	2.70 %	0.01 %	76.92	4.72
Ilkka-Yhtymä II	Loser	2436	3.48 %	-0.10 %	1437.43	-33.17
Innofactor (LP)	Neutral	2441	8.62 %	-0.04 %	19.20	-0.78
Kotipizza Group (LP)	Neutral	549	9.07 %	-0.20 %	502.96	-21.93
Lassila & Tikanoja	Neutral	2464	1.82 %	0.01 %	75.17	2.67
Lehto Group	Neutral	380	6.02 %	-0.10 %	315.49	-16.91
Lemminkäinen	Neutral	2450	2.52 %	0.03 %	359.61	12.47
Marimekko	Loser	2450	2.09 %	-0.04 %	81.19	-3.54
Olvi A	Winner	2464	2.95 %	-0.01 %	1143.41	-27.84
Orava Asuntorahasto	Loser	1012	3.50 %	-0.16 %	658.20	-22.97
Oriola-KD B	Neutral	2464	2.72 %	-0.02 %	213.85	-7.95
Outotec	Neutral	2464	3.05 %	-0.01 %	6.20	-0.45
Panostaja	Loser	2436	3.75 %	-0.08 %	1505.00	-34.39
Pihlajalinna	Neutral	607	10.50 %	0.47 %	571.47	23.54
Ponsse	Winner	2462	2.12 %	0.02 %	4.81	-0.07
Qt Group	Neutral	374	4.80 %	0.35 %	259.58	14.79
Raisio V	Neutral	2379	3.51 %	-0.03 %	1019.21	-25.79
Ramirent	Winner	2464	3.45 %	0.03 %	340.32	10.81
Raute A (LP)	Neutral	2329	2.18 %	0.05 %	214.94	8.13
Restamax	Neutral	910	5.56 %	-0.11 %	700.14	-24.79
Revenio Group	Winner	2464	2.67 %	0.06 %	18.63	-0.95
Sanoma	Loser	2464	2.94 %	-0.06 %	401.01	-12.65
SRV Yhtiöt	Neutral	2458	2.12 %	-0.01 %	8.49	0.32
Stockmann B	Loser	2464	4.24 %	0.01 %	1254.26	29.99
Suominen	Neutral	2365	3.09 %	-0.01 %	19.41	0.93
Technopolis	Neutral	2464	2.62 %	0.00 %	11.14	-0.13
Tecnotree	Loser	2461	4.54 %	-0.16 %	395.92	-12.83
Teleste	Neutral	2448	9.00 %	0.19 %	2172.67	45.23
Tikkurila	Neutral	1907	2.03 %	-0.03 %	329.69	-11.66
Tokmanni Group	Neutral	379	4.78 %	-0.20 %	257.91	-14.72
Uponor	Neutral	2464	2.44 %	0.01 %	9.24	-0.13
Vaisala A	Neutral	2457	9.14 %	0.19 %	2256.28	46.50
YIT	Neutral	2464	4.44 %	-0.09 %	994.76	-25.18

Appendix 1c. Statistics for Winners

Company	Winners/Loser	Observations	Standard deviation	Mean	Kurtosis	Skewness
Amer Sports A	Large Cap	2464	2.48 %	0.05 %	77.61	3.45
Basware	Mid&Small Cap	2457	2.14 %	0.05 %	10.15	-0.27
Bittium	Mid&Small Cap	2464	7.13 %	-0.08 %	1652.64	-36.74
Cargotec	Large Cap	2464	6.09 %	0.14 %	1590.66	35.75
Cramo	Mid&Small Cap	2464	2.57 %	0.02 %	5.79	-0.05
Huhtamäki	Large Cap	2464	2.42 %	0.09 %	249.10	8.89
Kemira	Large Cap	2464	2.28 %	0.02 %	11.37	-0.41
Kone	Large Cap	2464	3.49 %	0.00 %	1290.60	-30.53
Metso	Large Cap	2464	3.57 %	0.06 %	500.30	14.90
Metsä Board A	Large Cap	2332	6.08 %	-0.07 %	1113.88	-27.70
Neste	Large Cap	2464	3.56 %	0.08 %	834.39	22.05
Nokian Renkaat	Large Cap	2464	3.75 %	0.08 %	674.77	18.84
Olvi A	Mid&Small Cap	2464	2.95 %	-0.01 %	1143.41	-27.84
Ponsse	Mid&Small Cap	2462	2.12 %	0.02 %	4.81	-0.07
Ramirent	Mid&Small Cap	2464	3.45 %	0.03 %	340.32	10.81
Revenio Group	Mid&Small Cap	2464	2.67 %	0.06 %	18.63	-0.95
Sampo A	Large Cap	2464	2.18 %	0.01 %	299.95	-10.45
Sponda	Large Cap	2464	2.88 %	0.04 %	456.46	14.25
Stora Enso R	Large Cap	2464	2.53 %	0.03 %	16.96	1.14
UPM-Kymmene	Large Cap	2464	2.57 %	0.05 %	96.66	4.23
Wärtsilä	Large Cap	2464	5.61 %	0.14 %	1640.82	36.59

Appendix 1d. Statistics for Losers

Company	Winners/Loser	Observations	Standard deviation	Mean	Kurtosis	Skewness
Alma Media	Mid&Small Cap	2464	1.87 %	-0.03 %	13.92	-0.54
Apetit (LP)	Mid&Small Cap	2453	1.35 %	0.00 %	5.25	-0.35
Componenta	Mid&Small Cap	2398	4.41 %	-0.10 %	408.67	9.90
Fortum	Large Cap	2464	2.02 %	-0.01 %	50.42	2.00
Glaston	Mid&Small Cap	2462	2.97 %	-0.09 %	17.29	-1.22
HKScan A	Mid&Small Cap	2464	6.59 %	0.08 %	1974.43	42.05
Honkarakenne B (LP)	Mid&Small Cap	2149	2.70 %	0.01 %	76.92	4.72
Ilkka-Yhtymä II	Mid&Small Cap	2436	3.48 %	-0.10 %	1437.43	-33.17
Marimekko	Mid&Small Cap	2450	2.09 %	-0.04 %	81.19	-3.54
Nokia	Large Cap	2464	3.02 %	-0.09 %	65.48	-3.15
Orava Asuntorahasto	Mid&Small Cap	1012	3.50 %	-0.16 %	658.20	-22.97
Outokumpu	Large Cap	2464	3.55 %	-0.06 %	4.65	-0.08
Panostaja	Mid&Small Cap	2436	3.75 %	-0.08 %	1505.00	-34.39
Sanoma	Mid&Small Cap	2464	2.94 %	-0.06 %	401.01	-12.65
Stockmann B	Mid&Small Cap	2464	4.24 %	0.01 %	1254.26	29.99
Tecnotree	Mid&Small Cap	2461	4.54 %	-0.16 %	395.92	-12.83

Appendix 1e. Excluded companies

Company	Size
Afarak Group	Small Cap
Affecto (LP)	Small Cap
Aktia Pankki A	Mid Cap
Biohit B	Small Cap
Comptel	Excluded
Dovre Group	Small Cap
Efore	Small Cap
Elecster A	Small Cap
Elisa	Large Cap
Evli Pankki	Small Cap
Incap	Small Cap
Ixonos	Small Cap
Keskisuomalainen A	Small Cap
Kesla A	Small Cap
Nurminen Logistics	Small Cap
Pohjois-Karjalan Kirjapaino (LP)	Small Cap
Pöyry	Mid Cap
Rapala VMC	Mid Cap
Saga Furs C	Small Cap
Siili Solutions (LP)	Small Cap
Soprano (LP)	Small Cap
Sotkamo Silver	Small Cap
Taaleri	Mid Cap
Takoma	Bankrupt
Trainers' House (LP)	Small Cap
Tulikivi A	Small Cap
Valoe	Small Cap
Yleiselektroniikka E	Small Cap
Ålandsbanken B	Mid Cap

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