

DO ANALYSTS LEAK INFORMATION TO PREFERRED CUSTOMERS?

Anders Ekholm, Alexander von Nandelstadh**

Abstract

Our research question is whether financial analysts leak proprietary information to their preferred customers by warning them of future earnings forecast revisions. We explore this question by monitoring investors' trading behavior during the weeks prior to analyst earnings forecast revisions using a unique stock transactions data set from Finland. We do not find evidence of large investors systematically being warned of future earnings forecast revisions. However, our results indicate that the very largest investors show trading behavior partly consistent with being informed about future earnings forecast revisions.

Keywords: Financial analyst, information leakage, investor size

**Department of Finance at Hanken School of Economics, P.O. Box 479, 00101 Helsinki, Finland.*

We acknowledge the contribution of Thomson Financial for providing earnings per share forecast data, available through the Institutional Brokers Estimate System. This data has been provided as part of a broad academic program to encourage earnings expectation research.

1. Introduction

Financial analysts play an important role in the economy by both monitoring the governance of companies and disseminating information to the stock market. Financial analysts have however recently been accused for giving biased investment advice, as well as leaking their future earnings forecast revisions to preferred customers¹.

A condition for financial analyst information leakage being consequential is that analysts possess information that has implications for stock prices. Several studies have investigated the market impact of financial analysts' opinions on future stock performance. For instance Barber et al (2001), Barber and Loeffler (1993), Stickel (1995) and Womack (1996) examine stock price reaction to financial analyst stock recommendations, and find that positive (negative) recommendation changes on average are followed by positive (negative) returns. Busse and Green (2002) investigate how Morning Call and Midday Call segments on CNBC TV (which report analysts' views about individual stocks) influence stock prices, and put forward evidence indicating that stock prices respond within seconds of initial mention of the analyst report. In conclusion, the emerging consensus of academic research is that the opinions of the financial analysts impact stock returns².

Regardless of whether we view potential analyst information leakage as a phenomenon that compromises the fairness of stock markets or a Grossman and Stiglitz (1980) equilibrium, analyst information leakage has several implications for the functioning of stock markets. Our research question is hence whether financial analysts leak proprietary information to their preferred customers by warning them of future earnings forecast revisions.

We explore this question by monitoring the trading behavior of investors in Finland during the weeks prior to analyst earnings forecast revisions using a unique stock transactions data set in Finland. In summary, we do not find any convincing evidence of large investors systematically being warned of future earnings forecast revisions. On the other hand, our results indicate that the very largest investors show trading behavior partly consistent with being informed about future earnings forecast revisions. The results for these largest investors are however weakened by small sample size and other robustness problems. Our conclusion is hence that analysts do not, at least systematically, leak proprietary information to their preferred customers by warning them of future earnings forecast revisions.

The rest of the paper is organized as follows: section 2 presents the hypotheses and methodology; section 3 describes the data; section 4 presents and discusses the empirical results; section 5 provides a summary.

2. Hypothesis and methodology

In order to be able to monitor different investors' trading behavior prior to earnings forecast revisions,

¹ See for instance Wall Street Journal August 22, 2002; "Merrill Dismisses Stock Analyst For Alleged Warning to Clients".

² See for instance Kothari (2001).

we need to 1) identify the earnings forecast revisions, 2) measure investors' trading behavior, and 3) group investors according to their size.

2.1 Identifying earnings forecast revisions

We start by calculating financial analyst *a*'s change in his/her earnings forecast on firm *i*'s earnings during the forecasted period. Formally the earnings forecast revision is calculated as,

$$REV_{ait} = \frac{(E_{ait} - E_{ait-1})}{|E_{ait-1}|} \quad (1)$$

Where REV_{ait} is the scaled revision of analyst's *a*'s earnings forecast on firm *i*'s earnings during the forecasted period. E_{ait} is the updated forecast, while E_{ait-1} is the old forecast issued by analyst *a*. Absolute values are used in the denominator to allow for negative values.

One important source of information to investors as well as financial analysts is the firm's financial reports. Financial analysts often update their earnings forecasts due to the information conveyed in a financial report. Investors also make investment decisions based on financial reports³ and hence we cannot determine if earnings revisions after financial reports impact investors' investment decisions. Therefore, we drop earnings forecast revisions that are reported during a two-week period consecutive to a financial report to diminish the impact of financial reports on investors' investment decisions in our sample.

2.2 Measuring investor trading behavior

Investors' trading behavior for a certain company is gauged by first identifying all investors, who have traded in the company stock during the two calendar weeks preceding an earnings forecast revision, from the Finnish Central Securities Depository central register⁴. The net holdings 15 days before (NH_{t-15}) and one day before (NH_{t-1}) the earnings forecast revision are then calculated for each investor

separately by aggregating the initial balance and all transactions up to and including date *t-15* and *t-1*, respectively.

An investor trading behavior proxy $R_{t-15, t-1}$ is then calculated for each investor, company and earnings forecast revision:

$$R_{t-15, t-1} = (NH_{t-1} - NH_{t-15}) / NH_{t-1} \quad \text{if} \quad NH_{t-1} - NH_{t-15} > 0 \quad (2)$$

$$R_{t-15, t-1} = (NH_{t-1} - NH_{t-15}) / NH_{t-15} \quad \text{if} \quad NH_{t-1} - NH_{t-15} < 0 \quad (3)$$

$$R_{t-15, t-1} = 0 \quad \text{if} \quad NH_{t-1} - NH_{t-15} = 0 \quad (4)$$

The above defined measure $R_{t-15, t-1}$ hence expresses the following. If an investor has increased his/her net holding in a stock during the time period *t-15* to *t-1*, the measure expresses the fraction of the final position at time *t-1* that has been acquired. On the other hand, if an investor has decreased his/her net holding in a stock during the time period *t-15* to *t-1*, the measure expresses the fraction of the initial position at time *t-15* that has been sold out. Finally, if an investor has traded in a stock during the time period *t-15* to *t-1*, but not changed his/her net holding, the measure takes the value 0. Clearly, the above defined investor trading behavior proxy will be a continuous function taking values [-1, 1]. Further, the investor trading behavior proxy is symmetric, which is important in order to not introduce a bias in the variable.

An obvious alternative when measuring investors' trading behavior is to calculate the simple change in NH during the time period *t-15* to *t-1*. The above defined approach is however preferred for one fundamental and two econometric reasons. First, we believe that the investor trading behavior proxy defined in equations (2), (3) and (4) better expresses how investors themselves perceive their actions⁵. Second, if we employ the simple changes methodology an econometric problem occurs when the initial position NH_{t-15} equals 0 (division by zero). Third, the simple changes methodology by default induces a bias in $R_{t-15, t-1}$ since the distribution is asymmetric, taking values [-1, ∞] when $NH_{t-15} \neq 0$.

Another alternative when measuring investors' trading behavior is to employ a discrete framework, by for instance assigning the trading behavior proxy variable the value 0 for decreases in holdings and 1

³ For research on the relation between publicly available financial statement information and stock returns, see e.g. Abarbanell and Bushee (1997), Ball and Brown (1968) and Ou and Penman (1989).

⁴ If a company has multiple stock series, the different series are treated as separate companies in the analysis. This approach is taken since treating different stock series as one would yield measurement errors, since the stocks of the different series might be differently valued. Totally disregarding either of the series would naturally also yield potentially severe measurement errors.

⁵ This argument is primarily derived from the situation where we have small denominators. For instance, if an investor owns 100 shares and then acquires 1000 more, the percentage change would be $1100 / 100 - 1 = 1000\%$. The corresponding measure according to equation (1) would on the other hand take the value $(1100-100) / 1100 = 91\%$, which seems somewhat more intuitive.

for increases in holdings. However, by moving into a discrete framework we lose the magnitude of the trading behavior, as only the direction of the trading behavior remains. In summary, the in equations (2), (3) and (4) proposed and in this study employed way of measuring trading behavior enables us to measure both the direction and the magnitude of trading behavior, however avoiding the pitfalls of the simple changes methodology.

2.3 Measuring investor size

In order to measure investor size, we create two alternative investor size variables: one expressing relative size and one expressing absolute size. The relative size variable is generated by dividing the observations for each firm and earnings forecast revision separately into 10 equally large groups according to the net holding in number of shares at date $t-15$. The absolute size variable is created by dividing the observations into 10 equally large groups according to the net holding in Euros at date $t-15$. The created size groups are denoted by values from 1 (smallest 10th of initial holding) to 10 (largest 10th of initial holding).

3. Data

We have combined two data sets in the study, 1) the Finnish Central Securities Depository central register data set and 2) the Institutional Brokers Estimate System (I/B/E/S) provided by Thomson Financial.

3.1 The Finnish Securities Depository Central Register data set

The employed transaction data set is, to the best of our knowledge, one of the most comprehensive and complete transaction data sets that have been employed in this field of research up to this date. The Finnish Central Securities Depository central register contains virtually all transactions for the stocks of listed Finnish companies during the time period December 28 1994 to May 30 2000 with daily accuracy. The data set covers approximately 97% of the total market capitalization of the Helsinki Stock Exchange as of the beginning of the sample period, as reported by Grinblatt and Keloharju (2000), and further expands to cover all traded companies from the middle of the investigated period onwards. The Finnish Central Securities Depository central register is the official register of ownership, controlled by the Finnish Financial Supervision Authority, and can hence be viewed as extremely reliable and accurate. Altogether the data set consists of 25,400,767 observations for a total of 1,050,412 different investors, complete with transaction information (notification date, price, volume etc.) and investor

characteristics information (investor type, birth year, postal code, sex etc.). A settlement lag of three trading days is conventional on the Helsinki Stock Exchange and the date stamps in the data set include this lag, which is adjusted for in the empirical analysis presented below. Due to this three-day settlement lag, the transactions in the database are stamped between January 2 1995 and June 2 2000, and the initial balance as of December 27 1994 is stamped as January 1 1995.

Investors are categorized into six major groups according to their legal status. These six groups are further divided into several subgroups according to more specific characteristics. All Finnish individuals and institutions are required to register their holdings in their own name, but foreigners can choose to act in the name of a nominee. The holdings of foreigners that choose to act in a nominee name are pooled together into larger pools with the holdings of the nominee. However, the data set contains information that can be utilized to discriminate between transactions executed by foreigners and by the nominee itself. The task of disintegrating the foreigners acting in nominee names further into different subtypes, such as individuals and institutions, is however made impossible by nominee registration. Further, the register does not separate indirect shareholdings through financial institutions, such as mutual funds. Indirect holdings are registered in the names of the financial institutions, and are thus treated as property of the financial institutions in this study. This is well in line with the purpose of this study, as financial institutions by Finnish law must exercise full control over the investment policy of their indirect holdings.

3.2 The I/B/E/S data set

Financial analysts' earnings per share forecasts for Finnish firms are extracted from the I/B/E/S Detail files. Each observation in the data file represents an individual forecast and includes the necessary information needed for firm, brokerage and analyst identification. The I/B/E/S Detail files contain earnings per share forecasts ranging from February 18 1987 to November 15 2001. The query resulted in 23 283 number of earnings per share forecasts provided by 822 analysts at 123 brokerages on 201 Finnish firms. The study is conducted using annual earnings forecasts, issued during the year prior to the date when the actual earnings number is reported. In other words, we have only used FY1⁶ forecasts.

To diminish the possible effect of other information released simultaneously as the earnings forecast revisions, we drop those earnings revisions

⁶ I/B/E/S labels analyst forecasts for the current year as FY1 forecasts and FY2, FY3 for the consecutive years.

occurring in the two week period following an interim or annual report. The financial statement reporting dates are available through the Helsinki Stock Exchange. The HEX reporting date data set though restricts our sample to the period 1997-1999 and we furthermore limit our study to stocks listed on the more liquid main list⁷. Based on this sample we calculate analysts' earnings forecast revisions. Calculating the earnings forecast revisions for the time period and dropping the observations not recorded in the Datastream file⁸, results in 4 028 earnings forecast revisions. We further extract the extreme 100 observations of the total revisions sample, i.e. the event sample contains 50 positive and 50 negative earnings per share analyst revision.

3.3 Descriptive statistics

The total data set of Finnish earnings forecast revisions during 1.1.1997-31.12.1999 consists of 4 028 observations. We have extracted the 50 most positive and negative revisions and presented some descriptive statistics in Table 1, panel A. The median of financial analyst earnings forecast revisions are 2% downwards. This negative median is consistent with the well-documented positive bias in analyst forecasts⁹, as analysts tend to adjust downwards their optimistic forecasts throughout the year. Furthermore, we restrict the event sample to only consist of positive (negative) earnings forecast revisions that are followed by a positive (negative) one week cumulative abnormal stock return. The one week cumulative abnormal stock return criteria is used in order to ensure that the measured earnings forecast revisions contain at least some new information that is not already publicly known. If an earnings forecast revision does not affect the share price it is questionable if the revision contained any information not already available to the market. The restriction reduces the event sample to 18 positive earnings forecast revisions and 22 negative revisions. Panel B in Table 1 exhibits some descriptive statistics on the restricted sample. Moreover, panel C displays the characteristics of one week cumulative abnormal returns.

[Table 1]

⁷ Our preliminary analysis also shows that the earnings forecasts in the I/B/E/S data set are primarily issued for main list firms.

⁸ We use Datastream files to extract share price information.

⁹ For research on analyst's forecast bias see e.g. Ali et al (1992), Brown (1997), Easterwood and Nutt (1999) Kothari (2001), Lim (2001), O'Brien (1988) and Stickel (1990).

The data set that contains all investors' trading behavior prior to the most extreme positive (negative) earnings forecast revisions that are followed by a positive (negative) one week cumulative abnormal return, results in 9 151 observations. Descriptive statistics is presented in Table 2. Households constitute the majority of the sample in terms of number of executed transactions, both when considering observations for positive and negative earnings forecast revisions.

[Table 2]

We furthermore extract a sub sample due to selling restrictions present at the Helsinki Stock Exchange. Investors that hold zero number of shares two weeks before an earnings forecast revision can only buy stock if they choose to act during the period, given that they are not able to short-sell the stock. Therefore we exclude investors that have a zero initial investment, and present investor trading behavior prior to positive and negative earnings forecast revisions for the main FCS categories in Table 3.

[Table 3]

4. Results

This section is divided into two parts. In the former part, we display results from tests using the sample including investors with selling restrictions, i.e. those investors with a zero initial holding. In the latter part we employ the same tests as in the former part but on a reduced sample that excludes those investors who suffer from selling restrictions. Results from both samples are reported as both data sets have their drawbacks¹⁰. As average trading behavior for the different size groups are calculated by taking the equally weighted average of the investors' trading behavior, the sum of the average trading behavior for the different groups is not necessarily equal to zero¹¹.

4.1 Results for the sample including investors with selling restrictions

The average trading behavior prior to positive and negative financial analyst earnings forecast revisions

¹⁰ Including investors with selling restrictions forces the smallest groups in the sample to on average purchase shares. Excluding investors suffering from selling restrictions, on the other hand, dramatically reduces the number of smaller investors in the sample.

¹¹ Hence, the analysis might give an impression of the market not clearing, as the absolute size (in number of shares) of the transactions are not taken into account. However, we do not view this as a problem, as the analysis is focused on the *behavior* of the different investor groups.

are presented in Table 4. The results are based on the sample that includes investors with zero initial holdings. Small investors purchase shares, whereas larger investors reduce their holdings prior to financial analyst earnings forecast revisions. A factor possibly explaining the observed heterogeneous behavior for the different investor groups is that investing in stocks became increasingly popular amongst households in Finland during the time period 1997-1999. The differences between trading behavior prior to positive versus negative revisions are statistically significant for all investor size groups except Group 8. This indicates that investors' trading behavior is on average more positive (negative) in case of a positive (negative) earnings forecast revision.

[Table 4]

Figure 1 exhibits the investors' average trading behavior prior to positive and negative financial analyst earnings forecast revisions. The figure restates that on average the small investors purchase shares prior to financial analyst earnings forecast revisions, whereas larger investors on average sell prior to earnings forecast revisions.

[Figure 1]

In order to assess the economic importance of the different investors to financial analysts we calculate the initial holding also in terms of value. Table 5 exhibits investors' average trading behavior prior to positive and negative financial analyst earnings forecast revisions, grouped by the value of the initial holding. The results do not substantially deviate from the ones presented in Table 4, i.e. smaller investors purchase shares and larger investors sell shares prior to financial analyst earnings forecast revisions. The changes in holdings for the smallest groups are 100%, due to the selling restrictions faced by an investor that possess zero shares initially. Again, the differences between trading behavior prior to positive versus negative revisions are statistically significant for all investor size groups. This indicates that investors' trading behavior is on average more positive (negative) in case of a positive (negative) earnings forecast revision.

[Table 5]

Figure 2 shows the investors', grouped according to the value of the initial holding, average trading behavior prior to positive and negative earnings forecast revisions. The pattern is mainly similar to the one in Figure 1. The smallest investors are on average only purchasing shares prior to the earnings forecast revisions and larger investors are reducing their stock at the same time.

[Figure 2]

As the Finnish market is dominated by a small number of very large institutional investors, for whom sell side analysts compete, one could argue that the investigated groups are too large. In order to examine this line of argument, we look at the largest investors - measured by the value of their initial holdings - and compare their trading behavior prior to positive and negative earnings forecast revisions with the trading behavior of other investors. Table 6 exhibits the results based on the sample including investors with selling restrictions. The group with the largest 1% of initial holdings in terms of value consists of 38 and 53 observations for positive and negative revisions, respectively¹².

The results displayed in Table 6 reveals that the largest investors reduce their holding regardless if the earnings forecast revision is positive or negative, as do the bulk of investors. The difference in trading behavior prior to positive and negative earnings forecast revisions is not significantly different from zero for the group consisting of the largest investors, i.e. we cannot detect any differences in trading behavior prior to positive or negative revisions for this group of investors. All other investors though on average reduce more of their holdings prior to a negative revision than a positive revision. These results clearly do not support the notion of analysts warning large investors of forthcoming earnings forecast revisions, rather the contrary.

[Table 6]

4.2 Results for the sample excluding investors with selling restrictions

We further filter our sample of investors' trading behavior prior to earnings forecast revisions by excluding investors with selling restrictions. An investor that initially holds no shares is forced in our sample to purchase shares, as severe short selling restrictions are present for most shares traded on the Helsinki Stock Exchange. Therefore, we filter the sample to consist only of those investors that had the option either to accumulate or reduce their holdings prior to the earnings forecast revision. The results presented in this section are solely based on the sample excluding investors with selling restrictions.

Table 7 displays investors' trading behavior prior to positive and negative earnings forecast revisions for different investor size groups for data that excludes investors with selling restrictions. Investor

¹² The sample is not driven by a few earnings forecast revisions, as we have 14 unique positive revisions and 20 unique negative revisions.

size groups are created by dividing the observations into 10 equally large groups according to the net holding in number of shares at date t-15 for each firm separately. We find that both larger and smaller investors tend to sell shares, regardless if the earnings forecast revisions are positive or negative¹³. All investors are though reducing their holdings to a larger extent prior to a negative earnings forecast revision than prior to a positive revision.

[Table 7]

Furthermore we group the sample excluding investors with selling restrictions in ten groups by the value of the initial holding. This is made in order to better assess the economic importance of investors to financial analysts. Table 8 exhibits the average investors' trading behavior prior to positive and negative financial analyst earnings forecast revisions grouped by the value of the initial holding. The results do not substantially deviate from the ones presented in Table 7, i.e. both smaller and larger investors sell shares prior to financial analyst earnings forecast revisions. All ten groups show on average negative changes in holdings, which can be explained by the elimination of the investors with selling restrictions from the sample. The same pattern applies as earlier, i.e. the reduction of holdings is on average less prior to a positive earnings forecast revision than to a negative revision.

[Table 8]

We furthermore extract the 1% largest investors from the sample excluding investors with selling restrictions. The number of observations in the 1% largest investors group is rather small, 25 for positive revisions and 42 for negative revisions¹⁴. The results in Table 9 show that the largest investors on average accumulate their holding prior to financial analysts' positive earnings forecast revisions and reduce their holding prior to negative forecast revisions. Furthermore, the rest of the investors on average reduce their holdings prior to earnings forecast revisions. The difference in investors' trading behavior prior to positive and negative earnings forecast revisions is for large investors close to significant, especially considering the small sample size. Although no conclusive inferences can be drawn from the results, the results could be interpreted as weak support for the notion that financial analysts leak information regarding forthcoming earnings

forecast revisions to their largest clients.

[Table 9]

5. Summary

Prior research shows that financial analyst's recommendations have an impact on the value of traded stock. A positive (negative) change in a financial analyst's recommendation is in general followed by positive (negative) returns. As the views of the financial analysts clearly impact the stock market, an investor might profit from having access to financial analyst earnings forecast revisions in advance. Indeed, some indications of analysts warning their clients have been in the air, as recently reported by the financial press.

Using the unique official stock transactions data set from Finland combined with the analyst earnings forecast data set from I/B/E/S, we examine the trading behavior of investors prior to financial analysts' earnings forecast revisions. More specifically, we set out to investigate whether we can find indications of larger, or preferred, investors being warned of analyst forecast revisions in advance.

In summary, we do not find conclusive evidence of large investors systematically being warned of future earnings forecast revisions, as different groups of investors are found to behave fairly homogeneously before both positive and negative earnings forecast revisions. However, the results indicate that the very largest investors show trading behavior consistent with being informed of future earnings forecast revisions.

In the light of this study, it hence appears as the recently widely discussed ethical problem of analysts leaking information to some preferred customers, is a fairly uncommon or insignificant problem in the stock market.

References

1. Abarbanell, Jeffrey S. and Bushee, Brian J. (1997): "Fundamental Analysis, Future Earnings, and Stock Prices", *Journal of Accounting Research*, Vol. 35, 1-24
2. Ali, Ashiq; Klein, April and Rosenfeld, James (1992): "Analysts' Use of Information About Permanent and Transitory Earnings Components in Forecasting Annual EPS", *The Accounting Review*, Vol. 67, 183-198
3. Ball, Ray and Brown, Philip (1968): "An Empirical Evaluation of Accounting Income Numbers", *Journal of Accounting Research*, Vol. 6, 159-178
4. Brown, Laurence D. (1997): "Analyst Forecasting Errors: Additional Evidence", *Financial Analysts Journal*, Vol. 53, 81-88

¹³ As investors with no initial holdings are excluded from this sample, the markets do not clear in this analysis.

¹⁴ However, we feel that the sample is not entirely driven by a few events, as we have 14 unique positive revisions and 20 unique negative revisions.

5. Easterwood, John C. and Nutt, Stacey R. (1999): "Inefficiency in Analysts' Earnings Forecasts: Systematic Misreaction or Systematic Optimism?", *Journal of Finance*, Vol. 54, 1777-1797
6. Grossman, Sanford J. and Stiglitz, Joseph E. (1980): "On the Impossibility of Informationally Efficient Markets", *American Economic Review*, Vol. 70, 393-408
7. Kothari, S.P. (2001): "Capital Market Research in Accounting", *Journal of Accounting and Economics*, Vol. 32, 105-231
8. Lim, Terence (2001): "Rationality and Analysts' Forecast Bias", *Journal of Finance*, Vol. 56, 369-385
9. O'Brien, Patricia C. (1988): "Analysts' Forecasts as Earnings Expectations", *Journal of Accounting and Economics*, Vol. 10, 53-83
10. Ou, Jane A. and Penman, Stephen H. (1989): "Financial Statement Analysis and the Prediction of Stock Returns", *Journal of Accounting and Economics*, Vol. 11, 295-329
11. Stickel, Scott E. (1990): "Predicting Individual Analyst Earnings Forecasts", *Journal of Accounting Research*, Vol. 28, 409-417

Figure 1. Different investor size groups' (in # of shares) average trading behavior prior to positive and negative earnings forecast revisions

This figure displays average investor trading behavior prior to the disclosure of positive and negative analyst earnings forecast revisions. Events are defined as the events with positive (negative) earnings revisions followed by a positive (negative) t+6 cumulative abnormal return. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the analyst earnings forecast revisions. Investor size groups are created by dividing the observations into 10 equally large groups according to the net holding in number of shares at date t-15 for each firm separately. The investor size identification is done for each firm separately in order to avoid having any investor group excessively dominated by transactions in few firms. Investor size is hence defined as a relative measure among investors that trade in the same stock.

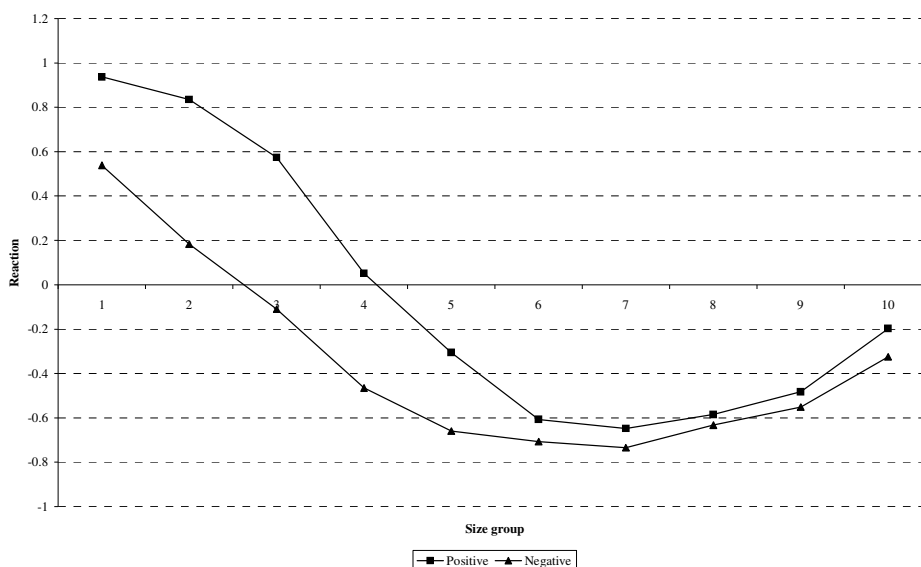


Figure 2. Different investor size groups' (in EUR) average trading behavior prior to positive and negative earnings forecast revisions

This figure displays the average investor trading behavior prior to the disclosure of positive and negative analyst earnings forecast revisions. Events are defined as the events with positive (negative) earnings revisions followed by a positive (negative) t+6 cumulative abnormal return. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the analyst earnings forecast revisions. Investor size groups are created by dividing the observations into 10 equally large groups according to the net holding in terms of value at date t-15 for each firm separately.

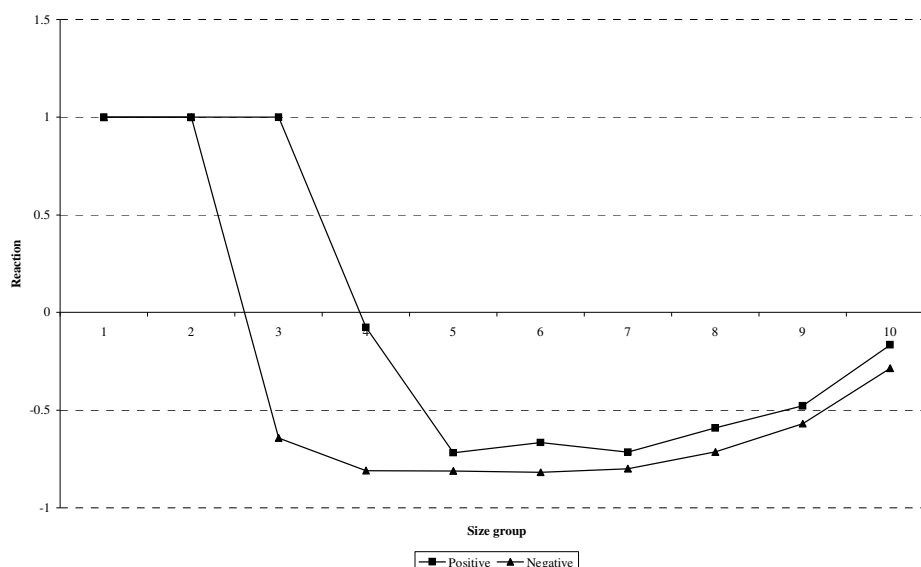


Table 1. Distribution of earnings forecast revisions and cumulative abnormal return

This table displays analyst earnings forecast revisions for firms listed on the Helsinki Stock Exchange during the time period 1.1.1997-31.12.1999. Panel A exhibits the distribution of revisions for the total sample, whereas Panel B displays the distribution of revisions for the sample used in our analysis. Only those positive (negative) earnings forecast revisions are included that are followed by a positive (negative) CAR t+6. Panel C shows the distribution of the CAR t+6 for the restricted sample used in Panel B. SEM stands for Standard Error of Mean.

PANEL A: Total earnings forecast revision sample					
Event type	N	Median	SEM	t-value	p-value
All revisions	4028	-2 %	2 %	-1.07	0.28
PANEL B: Average positive and negative earnings forecast revisions					
Event type	N	Median	SEM	t-value	p-value
Positive revisions	18	250 %	139 %	1.80	0.09
Negative revisions	22	-168 %	120 %	-1.41	0.17
PANEL C: Average CAR for positive and negative earnings forecast revision sample					
Event type	N	Median	SEM	t-value	p-value
Positive revisions	18	5.0 %	0.8 %	6.65	0.00
Negative revisions	22	-3.7 %	0.8 %	-4.71	0.00

Table 2. Investors' trading behavior prior to positive and negative earnings forecast revisions for the main FCSD categories, including investors with selling restrictions

This table displays the number of investor trading behavior observations for the investigated earnings forecast revisions for Finnish firms. The sample is divided into trading behavior prior to positive (negative) earnings forecast revisions with positive (negative) CAR t+6, and further into the six major investor categories defined by the Finnish Central Securities Depository central register. Altogether 18 positive and 22 negative events were investigated during the time period of 1.1.1997-31.12.1999. This table *includes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock.

Positive revisions		
Group	N	% of total
Companies	555	14.4%
Financial institutions	399	10.4%
General government	55	1.4%
Nonprofit organizations	76	2.0%
Households	2736	71.1%
Countries and International Organizations	26	0.7%
All positive	3847	100.0%

Negative revisions		
Group	N	% of total
Companies	744	14.0%
Financial institutions	447	8.4%
General government	104	2.0%
Nonprofit organizations	142	2.7%
Households	3814	71.9%
Countries and International Organizations	53	1.0%
All negative	5304	100.0%

Table 3. Investors' trading behavior prior to positive and negative earnings forecast revisions for the main FCSD categories, excluding investors with selling restrictions

This table displays the number of investor trading behavior observations for the investigated earnings forecast revisions for Finnish firms. The sample is divided into trading behavior prior to positive (negative) earnings forecast revisions with positive (negative) CAR $t+6$, and further into the six major investor categories defined by the Finnish Central Securities Depository central register. Altogether 18 positive and 22 negative events were investigated during the time period of 1.1.1997-31.12.1999. This table *excludes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock.

Positive revisions		
Group	N	% of total
Companies	335	13.2%
Financial institutions	318	12.5%
General government	50	2.0%
Nonprofit organizations	55	2.2%
Households	1766	69.5%
Countries and International Organizations	16	0.6%
All positive	2540	100.0%

Negative revisions		
Group	N	% of total
Companies	590	14.1%
Financial institutions	352	8.4%
General government	88	2.1%
Nonprofit organizations	122	2.9%
Households	2996	71.5%
Countries and International Organizations	41	1.0%
All negative	4189	100.0%

Table 4. Investors' trading behavior prior to positive and negative earnings forecast revisions for different size groups measured according to the net holding in number of shares, including investors with selling restrictions. This table displays average investor trading behavior prior to the disclosure of positive (Panel A) and negative (Panel B) analyst earnings forecast revisions. Revision events are defined as the events with the most positive (negative) earnings revisions and further meet the criteria of positive (negative) CAR $t+6$. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the disclosure of analyst earnings forecast revisions. Investor size groups are created by dividing the observations into 10

equally large groups according to the net holding in number of shares at date t-15 for each firm separately. The investor size identification is done for each firm separately in order to avoid having any investor group excessively dominated by transactions in few firms. Investor size is hence defined as a relative measure among investors that trade in the same stock. This table *includes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock. SEM stands for Standard Error of Mean.

PANEL: A - Positive revisions and positive CAR t+6						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding	393	94 %	1.7%	53.72	0.00	
Group 2	384	84 %	2.8%	30.04	0.00	
Group 3	386	57 %	4.1%	13.91	0.00	
Group 4	383	5 %	5.0%	1.04	0.30	
Group 5	381	-31 %	4.5%	-6.80	0.00	
Group 6	389	-61 %	3.4%	-17.85	0.00	
Group 7	384	-65 %	2.8%	-23.09	0.00	
Group 8	385	-59 %	2.9%	-20.11	0.00	
Group 9	385	-48 %	2.8%	-17.13	0.00	
Group 10 - Largest 10th of initial holding	377	-20 %	2.3%	-8.66	0.00	

PANEL: B - Negative revisions and negative CAR t+6						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding	540	54 %	3.6%	14.89	0.00	
Group 2	530	18 %	4.2%	4.32	0.00	
Group 3	531	-11 %	4.2%	-2.58	0.01	
Group 4	530	-47 %	3.6%	-12.78	0.00	
Group 5	526	-66 %	2.9%	-23.08	0.00	
Group 6	534	-71 %	2.5%	-28.51	0.00	
Group 7	532	-73 %	2.2%	-33.55	0.00	
Group 8	529	-63 %	2.2%	-28.72	0.00	
Group 9	532	-55 %	2.3%	-23.96	0.00	
Group 10 - Largest 10th of initial holding	520	-32 %	2.1%	-15.79	0.00	

PANEL: C - Difference in positive and negative revisions						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding		40 %	4.0%	9.92	0.00	
Group 2		65 %	5.1%	12.86	0.00	
Group 3		68 %	5.9%	11.54	0.00	
Group 4		52 %	6.1%	8.41	0.00	
Group 5		35 %	5.3%	6.64	0.00	
Group 6		10 %	4.2%	2.38	0.02	
Group 7		9 %	3.6%	2.43	0.02	
Group 8		5 %	3.6%	1.29	0.20	
Group 9		7 %	3.6%	1.89	0.06	
Group 10 - Largest 10th of initial holding		13 %	3.1%	4.13	0.00	

Table 5. Investors' trading behavior prior to positive and negative earnings forecast revisions for different size groups measured according to the net holding in terms of value, including investors with selling restrictions

This table displays average investor trading behavior prior to the disclosure of positive (Panel A) and negative (Panel B) analyst earnings forecast revisions. Revision events are defined as the events with the most positive (negative) earnings revisions and further meet the criteria of positive (negative) CAR t+6. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the disclosure of analyst earnings forecast revisions. Investor size groups are created by dividing the observations into 10 equally large groups according to the net holding in terms of value at date t-15 for each firm separately. This table *includes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock. SEM stands for Standard Error of Mean.

PANEL: A - Positive revisions and positive CAR t+6						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding	385	100 %	0.0%	n.m.	n.m.	
Group 2	385	100 %	0.0%	n.m.	n.m.	
Group 3	385	100 %	0.0%	n.m.	n.m.	
Group 4	385	-8 %	4.9%	-1.53	0.13	
Group 5	385	-72 %	2.9%	-24.56	0.00	
Group 6	385	-67 %	3.0%	-22.08	0.00	
Group 7	385	-71 %	2.6%	-27.61	0.00	
Group 8	384	-59 %	2.8%	-20.98	0.00	
Group 9	384	-48 %	2.9%	-16.64	0.00	
Group 10 - Largest 10th of initial holding	384	-17 %	2.2%	-7.46	0.00	

PANEL: B - Negative revisions and negative CAR t+6						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding	531	100 %	0.0%	n.m.	n.m.	
Group 2	531	100 %	0.0%	n.m.	n.m.	
Group 3	531	-64 %	3.2%	-20.31	0.00	
Group 4	531	-81 %	2.0%	-40.10	0.00	
Group 5	530	-81 %	1.9%	-41.90	0.00	
Group 6	530	-82 %	1.9%	-44.09	0.00	
Group 7	530	-80 %	1.8%	-44.47	0.00	
Group 8	530	-71 %	2.0%	-36.49	0.00	
Group 9	530	-57 %	2.3%	-25.18	0.00	
Group 10 - Largest 10th of initial holding	530	-29 %	2.0%	-14.52	0.00	

PANEL: C - Difference in positive and negative revisions						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding		0 %	0.0%	n.m.	n.m.	
Group 2		0 %	0.0%	n.m.	n.m.	
Group 3		164 %	3.2%	51.91	0.00	
Group 4		73 %	5.3%	13.74	0.00	
Group 5		9 %	3.5%	2.65	0.01	
Group 6		15 %	3.5%	4.30	0.00	
Group 7		9 %	3.2%	2.70	0.01	
Group 8		12 %	3.4%	3.56	0.00	
Group 9		9 %	3.7%	2.49	0.01	
Group 10 - Largest 10th of initial holding		12 %	3.0%	4.05	0.00	

Table 6. 1% largest investors versus other investors' trading behavior prior to positive and negative earnings forecast revisions, including investors with selling restrictions

This table displays average investor trading behavior prior to the disclosure of positive (Panel A) and negative (Panel B) analyst earnings forecast revisions. Revision events are defined as events with the most positive (negative) earnings revisions and further meet the criteria of positive (negative) CAR t+6. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the disclosure of analyst earnings forecast revisions. Investor size groups are created by extracting the 1% largest investors according to the net holding (EUR) at date t-15. This table *includes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock. The number of events, i.e. the number of earnings forecast revisions, for the largest 1% is 14 and 20 for positive and negative revisions respectively. SEM stands for Standard Error of Mean.

PANEL: A - Positive revisions						
Group	N	Average	SEM	t-value	p-value	
Largest 1% of initial holding	38	-3.0 %	2.3%	-1.29	0.21	
All other investors	3809	-4.1 %	1.4%	-2.85	0.00	

PANEL: B - Negative revisions						
Group	N	Average	SEM	t-value	p-value	
Largest 1% of initial holding	53	-3.2 %	1.4%	-2.27	0.03	
All other investors	5251	-34.8 %	1.1%	-30.57	0.00	

PANEL: C - Difference in positive and negative revisions						
Group	N	Average	SEM	t-value	p-value	
Largest 1% of initial holding		0.2 %	2.7%	0.09	0.93	
All other investors		30.7 %	1.8%	16.77	0.00	

Table 7. Investors' trading behavior prior to positive and negative earnings forecast revisions for different size groups measured according to the net holding in number of shares, excluding investors with selling restrictions. This table displays average investor trading behavior prior to the disclosure of positive (Panel A) and negative (Panel B) analyst earnings forecast revisions. Revision events are defined as the events with the most positive (negative) earnings revisions and further meet the criteria of positive (negative) CAR t+6. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the disclosure of analyst earnings forecast revisions. Investor size groups are created by dividing the observations into 10 equally large groups according to the net holding in number of shares at date t-15 for each firm separately. The investor size identification is done for each firm separately in order to avoid having any investor group excessively dominated by transactions in few firms. Investor size is hence defined as a relative measure among investors that trade in the same stock. This table *excludes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock. SEM stands for Standard Error of Mean.

PANEL: A - Positive revisions and positive CAR t+6						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding	261	-72 %	3.7%	-19.43	0.00	
Group 2	254	-77 %	3.4%	-22.46	0.00	
Group 3	254	-73 %	3.2%	-22.56	0.00	
Group 4	252	-67 %	3.7%	-18.28	0.00	
Group 5	252	-65 %	3.6%	-17.96	0.00	
Group 6	258	-59 %	3.6%	-16.34	0.00	
Group 7	254	-59 %	3.4%	-17.51	0.00	
Group 8	252	-51 %	3.5%	-14.61	0.00	
Group 9	256	-38 %	3.4%	-11.22	0.00	
Group 10 - Largest 10th of initial holding	247	-13 %	2.4%	-5.35	0.00	

PANEL: B - Negative revisions and negative CAR t+6						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding	426	-83 %	2.4%	-34.40	0.00	
Group 2	420	-81 %	2.3%	-34.98	0.00	
Group 3	420	-81 %	2.2%	-36.65	0.00	
Group 4	416	-81 %	2.1%	-38.52	0.00	
Group 5	416	-80 %	2.2%	-36.28	0.00	
Group 6	424	-77 %	2.2%	-35.72	0.00	
Group 7	418	-70 %	2.3%	-29.76	0.00	
Group 8	418	-59 %	2.5%	-23.63	0.00	
Group 9	422	-53 %	2.5%	-21.50	0.00	
Group 10 - Largest 10th of initial holding	409	-36 %	2.2%	-16.01	0.00	

PANEL: C - Difference in positive and negative revisions						
Group	N	Average	SEM	t-value	p-value	
Group 1 - Smallest 10th of initial holding		11 %	4.4%	2.44	0.01	
Group 2		5 %	4.1%	1.13	0.26	
Group 3		8 %	3.9%	1.97	0.05	
Group 4		14 %	4.2%	3.28	0.00	
Group 5		14 %	4.3%	3.36	0.00	
Group 6		18 %	4.2%	4.38	0.00	
Group 7		11 %	4.1%	2.62	0.01	
Group 8		8 %	4.3%	1.90	0.06	
Group 9		15 %	4.2%	3.62	0.00	
Group 10 - Largest 10th of initial holding		23 %	3.3%	6.88	0.00	

Table 8. Investors' trading behavior prior to positive and negative earnings forecast revisions for different size groups measured according to the net holding in terms of value, excluding investors with selling restrictions

This table displays average investor trading behavior prior to the disclosure of positive (Panel A) and negative (Panel B) analyst earnings forecast revisions. Revision events are defined as the events with the most positive (negative) earnings revisions and further meet the criteria of positive (negative) CAR t+6. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the disclosure of analyst earnings forecast revisions. Investor size groups are created by dividing the observations into 10 equally large groups according to the net holding in terms of value at date t-15 for each firm separately. This table *excludes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock. SEM stands for Standard Error of Mean.

PANEL: A - Positive revisions and positive CAR t+6					
Group	N	Average	SEM	t-value	p-value
Group 1 - Smallest 10th of initial holding	254	-78 %	3.5%	-22.49	0.00
Group 2	254	-71 %	3.7%	-19.23	0.00
Group 3	254	-75 %	3.4%	-22.13	0.00
Group 4	254	-62 %	3.9%	-15.95	0.00
Group 5	254	-75 %	3.0%	-24.89	0.00
Group 6	254	-63 %	3.4%	-18.74	0.00
Group 7	254	-57 %	3.5%	-16.07	0.00
Group 8	254	-51 %	3.6%	-13.96	0.00
Group 9	254	-33 %	3.4%	-9.87	0.00
Group 10 - Largest 10th of initial holding	254	-12 %	2.3%	-5.13	0.00

PANEL: B - Negative revisions and negative CAR t+6					
Group	N	Average	SEM	t-value	p-value
Group 1 - Smallest 10th of initial holding	419	-82 %	2.5%	-33.09	0.00
Group 2	419	-82 %	2.3%	-36.27	0.00
Group 3	419	-80 %	2.2%	-35.91	0.00
Group 4	419	-81 %	2.2%	-37.66	0.00
Group 5	419	-80 %	2.1%	-37.89	0.00
Group 6	419	-80 %	2.1%	-39.18	0.00
Group 7	419	-74 %	2.1%	-35.64	0.00
Group 8	419	-66 %	2.4%	-27.43	0.00
Group 9	419	-52 %	2.5%	-20.60	0.00
Group 10 - Largest 10th of initial holding	418	-23 %	2.1%	-11.21	0.00

PANEL: C - Difference in positive and negative revisions					
Group	N	Average	SEM	t-value	p-value
Group 1 - Smallest 10th of initial holding		5 %	4.3%	1.12	0.26
Group 2		12 %	4.3%	2.66	0.01
Group 3		5 %	4.1%	1.28	0.20
Group 4		20 %	4.4%	4.47	0.00
Group 5		5 %	3.7%	1.28	0.20
Group 6		18 %	3.9%	4.45	0.00
Group 7		18 %	4.1%	4.29	0.00
Group 8		15 %	4.3%	3.50	0.00
Group 9		19 %	4.2%	4.42	0.00
Group 10 - Largest 10th of initial holding		11 %	3.1%	3.63	0.00

Table 9. 1% largest investors versus other investors' trading behavior prior to positive and negative earnings forecast revisions, excluding investors with selling restrictions

This table displays average investor trading behavior prior to the disclosure of positive (Panel A) and negative (Panel B) analyst earnings forecast revisions. Revision events are defined as events with the most positive (negative) earnings revisions and further meet the criteria of positive (negative) CAR t+6. Investor trading behavior is measured as the number of stocks bought (sold) during the two weeks prior to the event divided by the total terminal (initial) number of stocks held. The investor trading behavior proxy hence expresses how a certain investor changes his/her holding in a certain company during the two weeks prior to the disclosure of analyst earnings forecast revisions. Investor size groups are created by extracting the 1% largest investors according to the net holding (EUR) at date t-15. This table *excludes* the smallest investors, i.e. those that initially did not own the stock and due to short selling restrictions are only able to purchase the stock. The number of events, i.e. the number of earnings forecast revisions, for the largest 1% is 14 and 20 for positive and negative revisions, respectively. SEM stands for Standard Error of Mean.

PANEL: A - Positive revisions					
Group	N	Average	SEM	t-value	p-value
Largest 1% of initial holding	25	0.7 %	1.1%	0.63	0.53
All other investors	2515	-58.2 %	1.1%	-50.80	0.00

PANEL: B - Negative revisions					
Group	N	Average	SEM	t-value	p-value
Largest 1% of initial holding	42	-2.3 %	1.6%	-1.42	0.16
All other investors	4147	-71.0 %	0.8%	-92.92	0.00

PANEL: C - Difference in positive and negative revisions					
Group	Average	SEM	t-value	p-value	
Largest 1% of initial holding	3.0 %	2.0%	1.53	0.13	
All other investors	12.7 %	1.4%	9.26	0.00	