Analyst Tipping: Evidence on Finnish Stocks

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Market analysts typically present their views on firms through publicly released recommendation reports and revisions, in which they 'upgrade' or 'downgrade' their stock picks. Traders can earn substantial profits if they have access to the information in these reports in advance of their public release. Analysts have an incentive to tip their major clients by earning commission on informed trades. Using data from the Nasdaq Helsinki between 2001 – 2014, we find evidence of analyst tipping. Trading patterns reveal that domestic institutional investors buy recommended stocks from four days prior to upgrades and sell from one day prior to downgrades. We also find evidence that the Market Abuse Directive slightly reduced analyst tipping in the two years following its implementation.

Key words: analyst upgrades, analyst downgrades, tipping

JEL classification: G14; G15; G24

Analyst Tipping: Evidence on Finnish Stocks

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This Draft: December 2017

Abstract

Market analysts typically present their views on firms through publicly released recommendation reports and revisions, in which they 'upgrade' or 'downgrade' their stock picks. Traders can earn substantial profits if they have access to the information in these reports in advance of their public release. Analysts have an incentive to tip their major clients by earning commission on informed trades. Using data from the Nasdaq Helsinki between 2001 – 2014, we find evidence of analyst tipping. Trading patterns reveal that domestic institutional investors buy recommended stocks from four days prior to upgrades and sell from one day prior to downgrades. We also find evidence that the Market Abuse Directive slightly reduced analyst tipping in the two years following its implementation.

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Analyst Tipping: Evidence on Finnish Stocks

1. Introduction

The role of sell-side analysts and the informational content of analyst reports have been well documented in the literature. Analysts are shown to have superior market timing and stock picking skills when issuing new recommendations (Womack 1996; Barber et al. 2001; Green 2006). Over the last decade, it has become more common for financial regulators to report cases of misconduct from brokerage firms that selectively pre-release private research information to their major clients. In 2007, the UK Financial Services Authority fined an equity analyst from Citigroup for intentionally leaking an upcoming strong buy initiation to his fund management clients (Womack 2007). In 2012, the United States Securities and Exchange Commission (SEC) charged Goldman Sachs $22 million for the absence of suitable internal policies to prevent the leakage of private research recommendations during weekly trading 'huddles'

The issue of analyst tipping deserves attention beyond ethical motivations. Corruption in financial markets is a source of market inefficiency, and identifying market weaknesses that can be improved with tighter regulations may improve investor confidence in financial markets. While there is substantial literature on analyst tipping, there is a lack of research on this topic in settings dominated by foreign investors. This study examines analyst tipping in the Nasdaq Helsinki, a market with over 50 percent foreign investor participation (Keloharju and Lehtinen 2015).

Previous research on analyst tipping has been restricted to a limited number of countries. Using data from the United States, Irvine et al. (2007) find evidence of abnormal institutional trading behaviour up to five days prior to the public release of 'buy' and 'strong buy' initiations. The authors propose that sell-side analysts have an incentive to boost their commissions by providing their main clients with early access to private information. Their findings have been confirmed in at least three other markets; Australia (Lepone et al. 2012), Korea (Kim et al.

2013), and Sweden (Anderson and Martinez 2014). This study contributes to this body of literature by looking for the same trading patterns in Finland.

This study also aims to assess the effectiveness of regulatory changes made in the Finnish market to monitor the behaviour of financial analysts. In 2004 and 2007, the Finnish market authority introduced two regulatory frameworks; the Market Abuse Directive (MAD) and the Market in Financial Instruments Directive (MiFID). The policies were introduced in order to promote market integrity, enhance market transparency, and harmonize conflicts of interest in the financial services market.

We find that recommended stocks experience average abnormal returns of 0.219% in the day prior to an upgrade, and -0.139% in two days prior to a downgrade. This suggest that domestic institutional investors are tipped with upcoming revisions of recommendations by brokerage firms. These investors abnormally buy recommended stocks from four days prior to upgrade announcements and abnormally sell recommended stocks from one day prior to downgrade announcements.

Evidence is also found that MAD may have reduced informed trading in the short run. In particular, domestic institutional investors are shown to exhibit less abnormal net purchase patterns in the years following MAD. There appear to be no changes in abnormal pre-event trading following MiFID.

2. Literature review

2.1 Profitability of analyst recommendations

Sell-side analysts typically express their insights about particular firms through stock recommendation reports. These reports present their views about the future profitability of firms, along with other firm-specific or industry-specific information. There is a large body of

literature that indicates that investors are more likely to capture additional profits if they have access to analyst reports prior to their public release.

Kim et al. (1997) examine the effects of initial buy coverage reports and find that stock prices of NYSE/AMEX firms increase by 4% and prices of NASDAQ firms increase by 7% immediately following the release of buy reports. Womack (1996) analyses price and volume reactions to United States analyst stock reports and finds large short-term returns. He concludes that sell-side analysts have superior market-timing and stock picking abilities.

The profitability of investment portfolios constructed from analyst-recommended stocks has also been studied. Barber et al. (2001) simulate the performance of a daily-rebalancing value-weighted portfolio with long (short) positions in stocks with most (least) favourable consensus recommendations in the United States. They find that these portfolios yield an average annual abnormal return of over 4%. Also using United States data, Green (2006) estimates that that clients with relatively early access to the recommended portfolio revisions could earn two-day returns of 1.02% by purchasing upgraded stocks, and returns of 1.5% by selling downgraded stocks.

The investment value of analyst recommendations is confirmed in markets outside the United States. Jegadeesh and Kim (2006) examine stock price reactions to recommendation revisions in the G7 countries (United States, United Kingdom, Canada, France, Germany, Italy, and Japan). They find that there are significant price reactions to revisions – both on the recommendation day and on the following day – in nearly all these countries. Moshirian et al. (2009) examine the post-recommendation buy and hold abnormal returns for stocks listed in 13 emerging markets. They argue that due to high informational asymmetries, illiquidity, and inadequate investor protection; the post-recommendation returns in emerging markets are larger than those in G7 countries. In addition, they present evidence that analyst recommendations in emerging markets are more positively biased as compared to those in G7 markets.

2.2 Information quality of analyst recommendations

The literature has not reached a consensus about the quality of information contained in analysts' reports. Francis and Soffer (1997) find that there are significant market reactions to both firm-specific earnings forecasts and stock recommendations, but that earnings forecasts do not subsume the quality of the stock recommendations.

Some research has investigated the role of timing in determining the information quality of recommendation reports. Ivković and Jegadeesh (2004) examine United States analyst stock recommendations and find that reports released in the week following earning announcements are the least informative, while upgrade recommendations reports released in the week prior to earnings announcements are the most informative. This suggests that the market has asymmetric reactions towards recommendation upgrades and downgrades. Frankel et al. (2006) study the cross-sectional determinants of the information quality of analyst's recommendations. They find that analyst reports tend to be more informative when brokerage firms are more likely to earn large profits (e.g. during a period of high return volatility, high institutional ownership, or high trading volume). However, analyst reports tend to be less informative when high information processing costs are incurred from security researchers. They also find that the marginal information quality of an additional analyst report on the same firm is not significantly different from zero.

Green et al. (2014) investigate analyst recommendations released following analyst-hosted invitation-only investor conferences. They show that those recommendations are more informative and yield greater returns than recommendations released by other non-hosted analyst revisions. Specifically, the average two-day abnormal returns for upgrades (downgrades) are 1.09%(-1.07%) larger. They conclude that analyst-hosted conferences function as channels for analysts to obtain firm-specific management information.

2.3 Evidence of analyst tipping

Irvine et al. (2007) propose the tipping hypothesis, which postulates that brokers have an incentive to tip their major clients by pre-releasing analyst recommendations in exchange for higher commission payments. They conduct a United States event study on initiations of buy or strong-buy analyst coverage and document abnormal institutional trading volume five days prior to the official announcement. They conclude that the recommendation initiations and specific characteristics of the initiating analyst would contribute to the abnormal buying behaviour. Specifically, institutional traders trade more actively when there is a strong buy recommendation or when the issuing analyst is an Institutional Investor All-American analyst with a high reputation.

Evidence of analyst tipping is also documented in the literature on the trading activities of short-sellers and market-makers. Juergens and Lindsey (2009) look at the trading activities of NASDAQ market-makers around the recommendation reports issued by analysts at the same firm, and find an increase in market-making volume around both upgrades and downgrades. Furthermore, they estimate abnormal trading profits for those market-makers of over $20 million two days prior to public release, and over $100 million one day prior to public release.

Christophe et al. (2010) investigate over 600 downgrades of NASDAQ stocks and find that the downgraded stocks experience abnormal short selling up to three days prior to the public release of downgrade reports. Lung and Xu (2014) find evidence of analyst tipping to option traders; examining over 2000 initiations, they estimate that option markets convey private information up to seven days prior to public announcements. Lin and Lu (2015) confirm these estimates.

Empirical evidence of analyst tipping in markets outside the United States is sparse. Lepone et al. (2012) find evidence for early information leakage of analyst recommendations in the

Australian market. They estimate that privately-informed traders could earn a four-week annualised cumulative abnormal return of 6.3% for upgrades and 12.5% for downgrades. They also show that the leakage of private information is concentrated around large brokers. In Sweden, Anderson and Martinez (2014) document abnormal profits from broker trades around upgrades of about $17 million annually. Empirical evidence from Korea indicates that analyst tipping is primary concentrated on neglected firms that receive a lower degree of analyst coverage (Kim et al. 2013), and that foreign and domestic institutional investors are tipped with different types of upcoming recommendations. Specifically, brokerage companies tend to leak negative reports to foreign institutional investors, while domestic institutional investors are more likely to receive leaked positive reports. Choi et al. (2015) investigate the trading behaviour between client and non-client investors in Korea and argue that institutional investor clients, who trade through the brokerage firms employing the issuing analyst, exhibit abnormal trading patterns one to two days prior to non-client institutional investors.

2.4 Regulations and analyst recommendations

There is a small body of research on the impact of analyst-targeted regulatory changes designed to improve the efficiency of markets. Madura and Premti (2014) are the first to evaluate the effectiveness of regulatory enforcements aimed to curb analyst tipping in the United States. They find that the regulations did reduce the informational leakage of upcoming recommendations.

Analysing the regulatory impacts of MAD and MiFID, Höfer and Oehler (2014) qualitatively investigate the role these two regulations play in mitigating potential conflicts of interests related to analyst recommendations. They argue that MAD and MiFID should have a small impact on the distribution of analyst recommendations; however, their analysis lacks

empirical backing. Gaps in their research beget a quantitative investigation on the impact of MAD and MiFID in governing sell-side analysts' use of recommendations.

3. Institutional background

3.1 Investor trading behaviour on the Nasdaq Helsinki

Unlike most stock exchanges, on the Nasdaq Helsinki, foreign investors dominate trading relative to domestic investors. Foreign investor trading accounts for approximately 50 percent of the total market capitalisation; while domestic households account for less than 20 percent (Keloharju and Lehtinen 2015). In terms of the market performance of foreign investors, Grinblatt and Keloharju (2000) document the outperformance of foreign investors compared to Finnish households. Furthermore, foreign investors in the Finnish market are shown to pursue momentum strategies while domestic households tend to act as contrarians. Booth et al. (2011) further state that foreign institutional investors in Finland are better informed than domestic institutional investors, with faster response times to news announcements. Foreign institutional traders tend to sell shares with negative news, however, domestic traders exhibit the opposite behaviour. This indicates the existence of differing trading strategies that exist between domestic and foreign investors in terms of information processing skills.

Several behavioural biases and informed individual trading practices in Finland are also documented in previous literature. Lehenkari and Perttunen (2004) confirm the loss aversion of Finnish household investors and suggest that they tend to continue holding losing stocks in their portfolio. By combining personal transaction data with investor tax filling, driving records and psychological profiles, Grinblatt and Keloharju (2009) find a positive relationship between the overconfidence and sensation seeking of Finnish retail investors and their trading frequency. Berkman, Koch and Westerholm (2014) study the trading activity through children accounts and they argue that the informed guardians would execute their informed trades through the

accounts of their children, especially before major corporate news and large price movements. Berkman, Koch and Westerholm (2016) further study the personal trading activity of financial experts in Finland and argue that they are likely to earn abnormal returns by trading ahead of major earning announcements, recommendation revisions or by front-running their clients' trades.

3.2 Regulatory environment

The Finnish Financial Supervisory Authority (FIN-FSA) is the authority that supervises Finland's financial service sector. The Market Abuse Directive (MAD) and the Market in Financial Instruments Directive (MiFID) were introduced by the European Commission in the early 2000s and integrated into Finnish law on 1 July 2005 and 1 November 2007. These directives set up requirements for firms that issue or disseminate analyst reports in order to promote fair presentation and disclosure of conflicts of interests. Analyst tipping is not explicitly prohibited by MAD and MiFID. Our study seeks to determine whether MAD and MiFID have decreased the prevalence of analyst tipping.

4. Research design

4.1 Event window and filtering rules

This study uses an event study methodology to test for the presence of analyst tipping in the Finnish market. Because the information content of stock recommendations is contained in the revision rather than in the level of the recommendations (Francis and Soffer 1997), the informational leakage of recommendation changes is expected to carry the private information that informed traders would capitalize on.

Previous research suggests that the information contents of the analyst recommendations could be confounded by extemporaneous corporate events or other analyst recommendations.

We control for these factors by excluding revisions released within 10 days of the release of earning announcements, and by excluding revisions published from more than one analyst on the same stock. We also omit recommendation revisions for all companies that had an initial public offering (IPO) in the last six months.

Figure 1 shows the sample event window used to investigate the extent of analyst tipping in Finland. A 21-day event window is used, starting from 10 days prior to the public announcement date of revision, and ending 10 days after the revision announcement date.

[Insert Figure 1 here]

Investors are grouped into four investor types: (i) domestic individuals; (ii) domestic institutions; (iii) foreign individuals; (iv) and foreign institutions. This style of classification is consistent with the approach used by Grinblatt and Keloharju (2000). The first three types of investors are identified by their classification information (provided in the data), and foreign institutions are identified by their registration in foreign nominee accounts.

4.2 Metrics

4.2.1 Abnormal return

In order to calculate the size-adjusted abnormal return[1], stocks are ranked by their market capitalisation at the end of each financial year. Following this procedure, five size-portfolios with equal weights in stocks are constructed according to their annual market size rank. $R(size_{jt})$ is the return of the size-portfolio j belonging to firm i at time t. The daily size-adjusted

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[1] To ensure robust results, I also calculate abnormal returns adjusted by market model, similar to the method used by Lepone et al. (2012).

abnormal return (AR_{it}) for firm i at time t is the difference between the daily stock return (R_{it}) and daily return of the size portfolio belonging to firm i:

$$AR_{it} = R_{it} - R(size_{jt}) \tag{1}$$

4.2.2 Cumulative abnormal return

Let event time t=0 for each event window be when the analyst revision is announced publicly. The cumulative abnormal return ($CAR_i(p,q)$) is the sum of abnormal return from $t = p$ to $t=q$:

$$CAR_{it}(p,q) = \sum_{t=p}^{q} AR_{it} \tag{2}$$

4.2.3 Abnormal trading volume

The benchmark trading volume is the average daily trading volume, scaled by the total number of outstanding shares, from four months to one month prior to the recommendation for the investor group n ($\overline{TV}_{itn}$). The abnormal trading volume (ATV_{itn}) for investor group n at time t on the covering stock i is the difference between the value of the daily trading volume (TV_{itn}) scaled by the total number of outstanding shares and the benchmark.

$$ATV_{itn} = TV_{itn} - \overline{TV}_{itn} \tag{3}$$

4.2.4 Abnormal net purchase

The daily net purchase measure (NP_{itn}) is the difference between the purchase volume and the sell volume, divided by the total trading volume.

$$NP_{itn} = (Purchase_{itn} - Sell_{itn})/(Total\ Trading\ Volume_{itn}) \qquad (4)$$

The abnormal net purchase measure (ANP_{itn}) is the difference between the value of the daily net purchase and the benchmark, which is the average daily net purchase from four months to one months prior to the recommendation ($\overline{NP}_{itn}$).

$$ANP_{itn} = NP_{itn} - \overline{NP}_{itn} \qquad (5)$$

All of these measures will be reported separately for upgrades and downgrades. Trading activities for each investor group are captured by the abnormal trading volume and abnormal net purchase measures. If analyst tipping exists in the Finnish market, abnormal trading volume is expected to increase in the days leading up to the public release of the revision. Also, the abnormal net purchase measure for institutional investors is expected to be significantly positive (negative) in the days leading up to the official analyst upgrade (downgrade) – this would suggest institutional investors are well informed about the content of upcoming revisions and that they seek to capitalise on private information by trading in the direction indicated by the leaked revisions.

Asymmetric price and trading patterns are expected to exist around the upward and downward revisions (Womack 1996, Lepone et al. 2012, Kim et al. 2013). Therefore, the difference in the price and trading responses to these two types of revisions can be compared. Discrepancies in trading patterns between different investor groups are examined through a t-test and a Wilcoxon signed-rank test.

4.3 Criteria for sub-sample analysis: MAD and MiFID periods

In order to investigate the regulatory effects of MAD and MiFID, the sample is divided into three time periods for investigation. Figure 2 shoes these sub-samples, which include (a) Pre-MAD and Pre-MiFID (1 January 2001 – 30 June 2005); (b) Post-MAD and Pre-MiFID (1 July 2005 – 31 October 2007); and (c), Post-MAD and Post-MiFID (1 November 2007 – 31 December 2014).

[Insert Figure 2 here]

The metrics used to investigate analyst tipping are reported separately for each period. Due to the more stringent requirements for the presentation and dissemination of analyst reports, and regulations for the relevant parties who have early access to the analyst report, we expect to see the least amount of evidence for analyst tipping in the post-MAD and post-MiFID period.

5. Data

The transaction data used in this study comes from Euroclear Finland Ltd, which contains detailed daily trade records, including unique investor IDs, investor identity information, stock ISIN code, transaction date, transaction type, transaction price, and trade volume. We employ daily account-level transaction data of stocks traded on the Nasdaq Helsinki from January 2001 to December 2014. Daily closing price and number of shares outstanding is obtained from Compustat through the Wharton Research Data Services (WRDS) database.

Analyst recommendation data are sourced from the Institutional Brokers' Estimate System Recommendations File (IBES), accessed from the WRDS database. This data includes the recommendation announcement date, activation date, stock ticker, brokerage firm ID, analyst ID, and analyst recommendation code. IBES codes each recommendation using a 5-point scale

(1=Strong Buy, 2= Buy, 3=Hold, 4=Underperform, 5= Sell). When analysts revise their recommendations, we categorise these revision as 'upgrades' (moving to a lower code number) or 'downgrades' (moving to a higher code number). Table 1 summarises analyst recommendations in each year over the sample period. The ratio of annual upgrades to annual downgrades remains relatively stable over the sample period, which indicates that neither MAD nor MiFID impacted the content of revisions.

The data on recommended stocks are supplemented with earnings estimate data sourced from the IBES Detail History file, which includes actual earnings, forecasted earnings, and earnings announcement date.

[Insert Table 1 here]

Table 2 presents summary statistics of analyst coverage. The recommendation data is sourced from IBES, which only accounts for covered stocks (about 70% of the total listed stocks). Some firms are followed by just one analyst, while other firms are followed by as many as 49 analysts. The mean number of analysts is 6 per firm.

[Insert Table 2 here]

Table 3 reports the mean daily net purchase measure by investor type for each year in the sample period. Domestic institutional investors trade as net-sellers in the market, with a mean net purchase measure of -2.3%. Domestic individual investors, on the other hand, tend to accumulate stocks, and have a mean net purchase measure of 3.6%. The disparity between these two groups' trading behaviour can be partially explained by the constraints of short-sales for individual investors. These constraints are less prevalent for institutional investors. Because

these two investor groups show different net purchase behaviour, they may also exhibit distinct trading patterns in response to analyst revisions.

[Insert Table 3 here]

6. Results

6.1 Abnormal daily returns and abnormal trading

To test the tipping hypothesis, we examine abnormal daily returns before and after the public release of analyst revisions. Table 4 presents the abnormal size-adjusted returns[2] within the 21-day event window [-10,10]. Consistent with evidence from previous studies (Womack 1996, Kim et al. 1997, Green 2006), there are significant abnormal returns immediately following recommendation revisions. On Day 0, an upgraded stock yields a mean abnormal return of 0.505% and a downgraded stock yields -0.383%. In terms of 3-day cumulative abnormal returns (Day 0 through Day 2), traders earn 0.81% more on average by buying (following upgrade revisions) and 0.774% by selling (following downgrade revisions). These findings suggest that analysts' recommendation revisions are profitable and price-informative. Figure 3 plots the cumulative abnormal returns surrounding analysts' recommendation revisions from Day -10 to Day 10. Market price changes following upgrade and downgrade revisions are asymmetric, consistent with the findings reported by Womack (1996). Cumulative abnormal returns for an upgrade begin to level off on Day 2. However, following a downgrade, abnormal returns do not level off on Day 2; rather, they continue to decline through Day 10.

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[2] Appendix A presents the abnormal returns adjusted for the market model with longer estimation windows.

[Insert Table 4 here]

[Insert Figure 3 here]

Table 5 reports abnormal trading volume around analyst revision dates. In the days leading up to the public release, average trading volume becomes more abnormal (results are significant at the 1% level). This suggests that there is information leakage prior to the release of the revisions. By trading two days prior to an upgrade, informed traders earn 5-day (Day -2 to Day 2) cumulative abnormal returns of 1.068% on average. For a downgrade, the abnormal returns are estimated to be -1.377%. The abnormal price movement for a downgraded stock begins one day prior to the abnormal price movement for an upgraded stock. This would help explain why the degree of abnormal returns for downgraded stocks is lower than for upgraded stocks on Day 0 – it is possible that a portion of the information has already been incorporated into the stock price.

[Insert Table 5 here]

Trading volume increases abnormally from Day -1 for both upgrades and downgrades. Post-event abnormal trading volume is larger for an upgrade than for a downgrade. This could be explained by the short-sales constraints faced by retail investors– those retail investors are not able to trade on the information of the downgrade by short-selling, which would result in the less abnormal trading following a downgrade.

Detailed trading behaviours within the event window for different investor groups are displayed in Table 6. Domestic institutional investors adopt more aggressive buy-in strategies from 4 days prior to the official upgrade revision release date, purchasing 4.7% more on average between Day -4 and Day -2. This pre-event abnormal trading behaviour is consistent with the hypothesis that analyst tipping will be evidenced through higher levels of abnormal trading activity prior to revision release. Abnormal buying activity continues through Day 6 for domestic institutions. They do not exhibit abnormal selling activity following a downgrade.

[Insert Table 6 here]

Although foreign institutional investors do exhibit abnormal pre-event trading before both upgrades and downgrades, they tend to execute these trades in the opposite direction from what is proposed by the revisions. Foreign institutions sell (buy) approximately 1% more on average on Days -5 and -3 before the upgrade (downgrade) revisions are publicly released. This pattern suggests that sell-side analysts are not tipping foreign institutional investors prior to the public release of recommendations.

Taking abnormal pre-event returns into consideration (see Table 4), domestic institutional investors eventually outperform foreign institutions within the event window for both upgrades and downgrades. This finding deviates from some of the findings presented in previous literature on the Nasdaq Helsinki – specifically, that foreign institutions outperform domestic institutions (Grinblatt and Keloharju 2000) and that foreign institutions processes information more quickly than domestic institutions (Booth et al. 2011). Our results can be explained by potential 'home bias's of sell-side analysts in pre-releasing recommendation reports to their clients. For example, Kim, Park and Park (2013) document that brokerage

companies selectively leak their reports to their clients that they tend to leak negative reports to foreign institutional investors, while domestic institutional investors are more likely to be tipped with positive reports.

We now turn our attention to the individual investors. Domestic individual investors exhibit abnormal buying behaviour throughout the entire upgrade revision event window. The abnormality of these purchases is significant at the 1% level from Day -7 through Day 3. Between Day -10 and Day 0, the abnormality in purchase behaviour of domestic individuals is strikingly similar to that of domestic institutions. Table 6 Panel A Column (1)-(2) displays the t-stat/Wilcoxon difference between the abnormal purchase behaviour of these two groups; only once during the 10-day lead-up to the public upgrade release is the difference statistically significant. Following the public upgrade release, purchases from domestic institutions are larger than purchases from domestic individuals.

Before downgrade recommendations are publicly announced, domestic individuals exhibit trade abnormalities from as early as Day -9. These individuals purchase 2-3% less than normal for the downgraded stocks between Day -7 and Day -3. Domestic individuals and domestic institutions show similar trade patterns in the days leading up to the public release of the downgrade revision. Thus, the evidence suggests that domestic individuals also have access to leaked information in advance of downgrade announcements. This is a puzzling finding, as sell-side analysts likely have no incentive to leak upcoming recommendations to both institutional and individual investors. This issue is discussed in greater detail in Section 6.3.

The trading activity of foreign individual investors is consistent with the hypothesis that these are uninformed traders. Foreign individual investors do not exhibit any noteworthy abnormal trading behaviour within the upgrade and downgrade event windows.

6.2 Regulatory effects of MAD and MiFID

In order to analyse the regulatory effects of MAD and MiFID on analyst tipping, we divide the sample into three periods: pre-MAD/pre-MiFID (1 January 2001 – 30 June 2005), post-MAD/pre-MiFID (1 July 2005 – 31 October 2007), and post-MAD/post-MiFID (1 November 2007 – 31 December 2014). Table 7 presents the size-adjusted abnormal returns surrounding analysts' recommendation revision dates for the three periods. Overall, our results suggest that MAD and MiFID may have contributed to reductions in pre-event abnormal returns. Particularly, MAD seems to have had a stronger effect than MiFID.

< Insert Table 7 here >

Prior to the introduction of MAD and MiFID, pre-upgrade returns are 0.395% on Day -2 and 0.384% on Day -1 (both statistically significant at the 1% level). This indicates that the information content of upgrades is incorporated into stock prices from two days prior to the recommendation revisions. After MAD is introduced but before the implementation of MiFID, pre-upgrade abnormal returns on Day -2 and Day -1 are smaller and no longer statistically significant. Thus, pre-upgrade trading behaviour became less abnormal on average in the years following the implementation of MAD (before MiFID). After MiFID is implemented, pre-upgrade abnormal returns are smaller than in the pre-MAD/pre-MiFID period, and only weakly statistically significant on Day -1. This suggests that between the two regulations, MAD had the stronger effect in reducing pre-upgrade abnormal trading.

For downgrade revisions, the pre-MAD/pre-MiFID abnormal returns are -0.38% on Day -3, and -0.499% on Day -1 (both statistically significant at the 1% level). This indicates that the information content of downgrades is incorporated into stock prices from three days prior to

revisions. In the post-MAD/pre-MiFID period, the abnormal returns for these days are less negative than before and no longer statistically significant. Thus, pre-downgrade trading behaviour became less abnormal on average in the years after MAD was introduced (before the implementation of MiFID). In the post-MAD/post-MiFID period, pre-downgrade abnormal returns are more negative than in the previous period, and now statistically significant at the 1% level for Day -1. This indicates that there was a 'bounce-back' in pre-downgrade abnormal trading. Thus, the results suggest that of the two regulations, MAD had the stronger effect in reducing pre-downgrade abnormal trading.

6.3 Trading patterns of domestic individual investors

The results presented in Section 6.1 show that domestic individual investors and domestic institutional investors exhibit similar patterns of trade in the days leading up to the public release of downgrade revisions, suggesting that analysts may be leaking information to both groups. Analysts likely have economic motivations in tipping their institutional clients, but these incentives are unlikely to exist for individual clients. Nevertheless, evidence of informed individual trading in Finland has been documented. Berkman et al. (2014) show that Finnish individual traders sometimes execute informed trades through their children's accounts before earnings or takeover announcements or before large price changes. The informed trading of Finnish financial experts from financial intermediaries has also been documented (Berkman et al. 2016). Therefore, it is possible that the abnormal pre-event trading of domestic individuals is the result of insider trading.

To distinguish between those domestic individual investors who are potentially executing informed trades and those who are not, we divide the sample of domestic individual investors into two sub-groups. The 'active' domestic individual investors with top 10% annual

dollar trading volume in the 10-day pre-event windows (Day -10 through Day -1) are categorized as investor type A. The remaining domestic individual investors are categorized as investor type B. Table 8 below reports the mean daily trading statistics for these two groups.

< Insert Table 8 here >

Investor type A trades with an overall mean daily dollar volume four times that of investor type B. In the 21-day event window surrounding upgrades (downgrades), the mean daily dollar volume of investor type A is eight (seven) times larger than that of investor type B. Type A investors exhibit net-selling patterns for both upgrades and downgrades, while type B investors act as net-buyers. Less sophisticated investors are often constrained when it comes to short-sales, and therefore have tendency to buy rather than sell.

Table 9 presents the daily abnormal net purchase measures surrounding revision release dates for domestic individual investor types A and B. Type A investors show patterns of abnormal trading, net-selling in large volumes in advance of downgrades. This suggests that informed domestic individual investors fall into group A – their pre-downgrade selling patterns suggest they possess information about the upcoming revisions. Type B investors do not show abnormal patterns of selling in advance of downgrades.

However, type B investors do show patterns of abnormal trading in advance of upgrades – this group purchases abnormally large volumes from Day -10 through Day 0 for upgrade revisions. Furthermore, the pre-upgrade abnormal net purchase measure is larger for investor type B than for investor type A. Thus, type B investors appear to be more informed than type A investors in advance of revision upgrades.

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< Insert Table 9 here >

Our results indicate that dollar trading volume is a poor choice of proxy for distinguishing between informed domestic individuals and uninformed domestic individuals. The authors acknowledge that the data employed in this study lacks detailed information on investor characteristics, which could potentially help to distinguish informed traders from uninformed traders.

7. Conclusion

Using the event study approach, this study investigates price and trading patterns of different investor types surrounding the public release of analyst recommendation revisions in the Nasdaq Helsinki. We document abnormal returns of 0.219% from Day -1 prior to upgrade releases and abnormal returns of -0.139% from Day -2 and -0.463% from Day -1 prior to downgrade releases. Our results indicate information leakage prior to the public release of analyst revisions.

By grouping investors into four groups (domestic individual, domestic institution, foreign individual, foreign institution) the study is able to detect whether any group exhibits abnormal patterns of pre-event trading, where such trading could have been triggered by analyst tipping. Consistent with the previous literature documenting the information advantage of institutional investors, our results show that domestic institutions exhibit patterns of informed trading. This group of investors aggressively buy recommended stocks from four days prior to upgrade revisions and sell recommended stocks from one day prior to downgrade revisions. Although

foreign institutional investors also exhibit abnormal trading patterns prior to the public release of revisions, their patterns of abnormal trade are in the opposite direction of the revisions.

Contrary to our belief that analysts will only tip their institutional clients in exchange for higher commission payments, the results indicate that domestic individuals may also receive insider informed. They too act as informed traders in the days leading up to analyst revisions.

This study also provides estimations of the impacts MAD and MiFID on the prevalence of analyst tipping. The results suggest that MAD had a minor short-term impact on reducing informed trading, but that MiFID has no impact.

Future research should investigate the characteristics of informed traders and attempt to understand how or why domestic individuals receive insider information. It would also be valuable to estimate the degree of analyst tipping and how this affects the market. Across international markets, future research could aim to determine whether ratio of foreign investors to domestic investors is correlated with insider tipping.

References

Anderson, A. and Martinez, J. V. 2014, 'Brokerage-Firm Trading and Profits Around Recommendation Revision Dates', *Working Paper*, Swedish House of Finance; University of Connecticut.

Barber, B., Lehavy, R., McNichols, M. and Trueman, B. 2001, 'Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns', *Journal of Finance*, vol. 56, no. 2, pp. 531-563.

Berkman, H., Koch, P. D. and Westerholm, P. J. 2014, 'Informed Trading through the Accounts of Children', *Journal of Finance*, vol. 69, no. 1, pp. 363-404.

Berkman, H., Koch, P. D. and Westerholm, P. J. 2016, 'Personal Trading by Employees of Financial Intermediaries', *Working Paper*.

Booth, G. G., Kallunki, J.P., Sahlström, P. and Tyynelä, J. 2011, 'Foreign vs domestic investors and the post-announcement drift', *International Journal of Managerial Finance*, vol. 7, no. 3, p. 220-237.

Choi, B., Jung, K. and Lee, D. 2015, 'Trading Behavior Prior to Public Release of Analyst Reports: Evidence from Korea', *Contemporary Accounting Research*, vol. 32, no. 1, pp. 105-138.

Christophe, S. E., Ferri, M. G. and Hsieh, J. 2010, 'Informed trading before analyst downgrades: Evidence from short sellers', *Journal of Financial Economics*, vol. 95, no. 1, pp. 85-106.

Eaglesham, J. 2012, 'Goldman Sachs Fined $22 Million Over 'Huddles'', *Wall Street Journal*, 12 April, viewed 1 May 2016,
<http://www.wsj.com/articles/SB10001424052702304356604577339733899197986>

Francis, J. and Soffer, L. 1997, 'The Relative Informativeness of Analysts' Stock Recommendations and Earnings Forecast Revisions', *Journal of Accounting Research*, vol. 35, no. 2, pp. 193-211.

Frankel, R., Kothari, S. P. and Weber, J. 2006, 'Determinants of the informativeness of analyst research', *Journal of Accounting and Economics*, vol. 41, no. 1–2, pp. 29-54.

Green, T. C. 2006, 'The Value of Client Access to Analyst Recommendations', *Journal of Financial and Quantitative Analysis*, vol. 41, no. 01, pp. 1-24.

Green, T. C., Jame, R., Markov, S. and Subasi, M. 2014, 'Access to management and the informativeness of analyst research', *Journal of Financial Economics,* vol. 114, no. 2, pp. 239-255.

Grinblatt, M. and Keloharju, M. 2000, 'The investment behavior and performance of various investor types: a study of Finland's unique data set', *Journal of Financial Economics,* vol. 55, no. 1, pp. 43-67.

Grinblatt, M. and Keloharju, M. 2009, 'Sensation Seeking, Overconfidence, and Trading Activity', *Journal of Finance*, vol. 64, no. 2, pp. 549-578.

Höfer, A and Oehler, A 2014, 'Analyst recommendations and regulation: Scopes for european policy makers to enhance investor protection', *International Advances in Economic Research*, vol. 20, no. 4, pp. 369-384.

Irvine, P., Lipson, M. and Puckett, A. 2007, 'Tipping', *Review of Financial Studies,* vol. 20, no. 3, pp. 741-768.

Ivković, Z. and Jegadeesh, N. 2004, 'The timing and value of forecast and recommendation revisions', *Journal of Financial Economics*, vol. 73, no. 3, pp. 433-463.

Jegadeesh, N. and Kim, W. 2006, 'Value of analyst recommendations: International evidence', *Journal of Financial Markets*, vol. 9, no. 3, pp. 274-309.

Juergens, J. L. and Lindsey, L. 2009, 'Getting Out Early: An Analysis of Market Making Activity at the Recommending Analyst's Firm', *Journal of Finance*, vol. 64, no. 5, pp. 2327-2359.

Keloharju, M. and Lehtinen, A. 2015, 'Shareownership in Finland 2015', *Working Paper*, Aalto University.

Kim, S. T., Lin, J. C. and Slovin, M. B. 1997, 'Market Structure, Informed Trading, and Analysts' Recommendations', *Journal of Financial and Quantitative Analysis,* vol. 32, no. 04, pp. 507-524.

Kim, K. S., Park, Y. W. and Park, J. W. 2013, 'Analyst Tipping on Neglected Firms: Evidence from the Korean Stock Market', *Asia-Pacific Journal of Financial Studies,* vol. 42, no. 2, pp. 262-286.

Lehenkari, M. and Perttunen, J. 2004, 'Holding on to the Losers: Finnish Evidence', *Journal of Behavioral Finance,* vol. 5, no. 2, pp. 116-126.

Lepone, A., Leung, H. and Li, J. G. 2012, 'Unequal access to analyst research', *Australian Journal of Management,* vol. 38, no. 2, pp. 253-277.

Lin, T. and Lu, X. 2015, 'Why do options prices predict stock returns? Evidence from analyst tipping', *Journal of Banking & Finance*, vol. 52, pp. 17-28.

Lung, P. P. and Xu, P. 2014, 'Tipping and Option Trading'*, Financial Management*, vol. 43, no. 3, pp. 671-701.

Madura, J and Premti, A 2014, 'Impact of regulatory enforcement on leakages prior to analyst recommendations', *Financial Review*, vol. 49, no. 3, pp. 565-592.

Moshirian, F., Ng, D. and Wu, E. 2009, 'The value of stock analysts' recommendations: Evidence from emerging markets', *International Review of Financial Analysis,* vol. 18, no. 1, pp. 74-83.

Wearden, G. 2007, 'FSA fines analyst for malpractice', *Guardian*, 2 June, viewed 1 May 2016, <https://www.theguardian.com/business/2007/mar/20/1>

Womack, K. L. 1996, 'Do Brokerage Analysts' Recommendations Have Investment Value?', *Journal of Finance,* vol. 51, no. 1, pp. 137-167.

21-Day Event Window

Anticipated Abnormal
Institutional Trading Period

-10   -5   t = 0   10

Revision Date
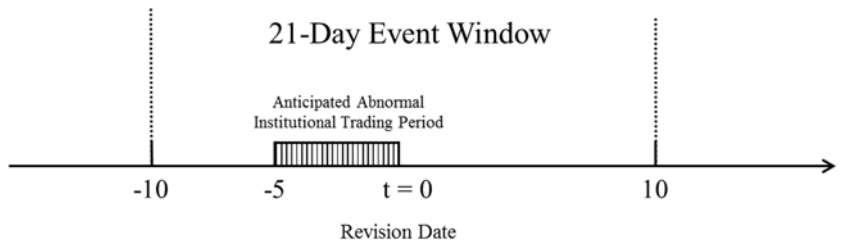
Figure 1: Event Window to Examine for Analyst Tipping in Finland

| Pre-MAD & Pre-MiFID | Post-MAD & Pre-MiFID | Post-MAD & Post-MiFID |

1 January 2001   30 June 2005   1 November 2007   31 December 2014
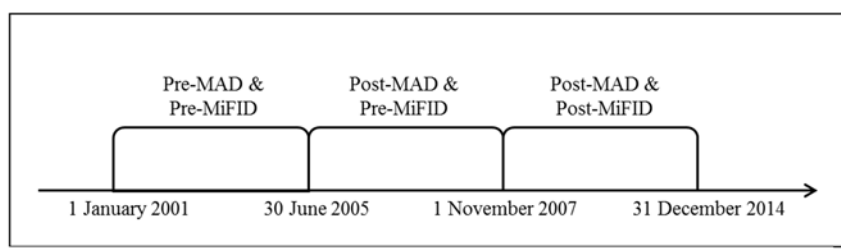
Figure 2 : Sub-Samples in Event Study
Figure 2 shows the sub-samples used to assess the regulatory effects of MAD and MiFID.
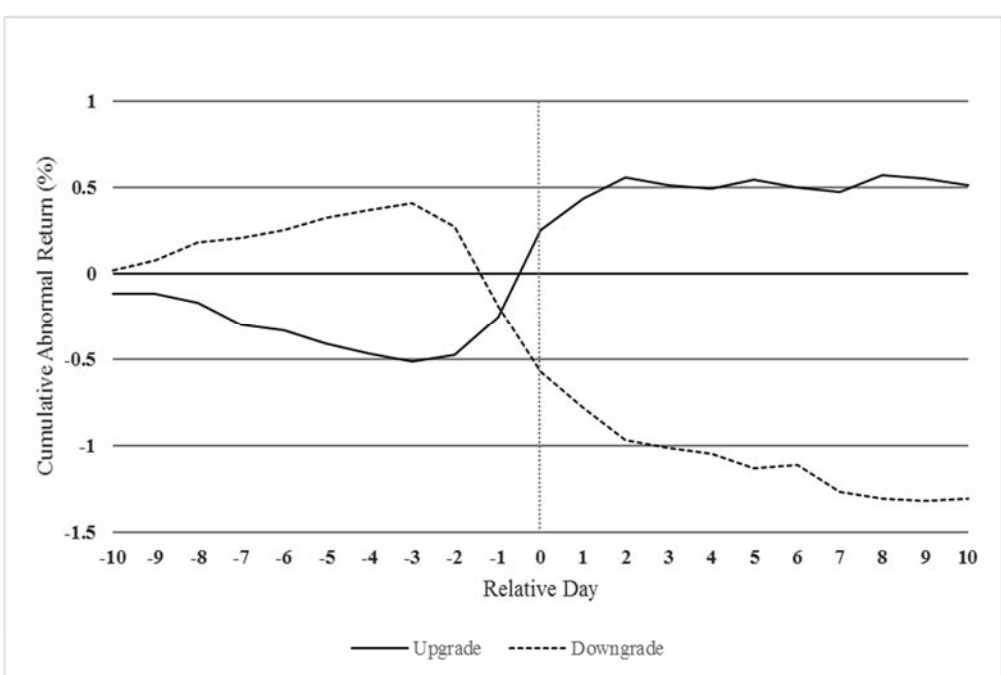
Figure 3. Cumulative Abnormal Returns Surrounding Recommendation Revisions.
This figure shows the cumulative abnormal returns surrounding analysts' recommendation revisions from -10 to 10. Abnormal return is the size-adjusted abnormal return, which is the difference between the daily stock return in time t and daily return of the size portfolio that the firm belongs to in time t. Cumulative abnormal return (CAR) is the sum of abnormal returns from t = -10. Solid line represents the mean CAR for upgrades and dashed line represents the mean CAR for downgrades.

Table 1
Descriptive statistics for analyst recommendations

This table reports the number of recommendations for stocks in the Nasdaq Helsinki between 2001 to 2014. The buy and strong buy recommendations are categorized as positive recommendations, while underperform and sell recommendations are categorized as negative recommendations. % (Positive) reports the percentage of positive recommendations among the total recommendations for that year. Revisions are identified by changes in the 5-point recommendation code. Positive changes in code are categorized as downgrades and negative changes are categorized as upgrades. % (Upgrades) reports the percentage of upgrade revisions among total revision for that ear. Panel A presents summary statistics for the full sample and Panel B presents the statistics for the clean sample.

Panel A: Full sample

Year	Recommendations				Revisions				Stocks	Revisions Per Stock
	Positive	Negative	Total	% (Positive)	Upgrades	Downgrades	Total	% (Upgrades)		
2001	341	227	829	0.411	83	112	195	0.426	163	1.20
2002	737	466	1612	0.457	217	274	491	0.442	158	3.11
2003	436	341	1041	0.419	160	251	411	0.389	153	2.69
2004	538	247	1002	0.537	198	179	377	0.525	153	2.46
2005	589	334	1175	0.501	242	284	526	0.460	154	3.42
2006	684	363	1332	0.514	299	377	676	0.442	154	4.39
2007	793	367	1582	0.501	362	352	714	0.507	152	4.70
2008	645	438	1498	0.431	332	418	750	0.443	148	5.07
2009	568	399	1306	0.435	331	357	688	0.481	145	4.74
2010	631	312	1347	0.468	284	263	547	0.519	140	3.91
2011	813	417	1669	0.487	369	340	709	0.520	140	5.06
2012	502	308	1197	0.419	290	307	597	0.486	134	4.46
2013	394	348	1084	0.363	251	327	578	0.434	140	4.13
2014	485	265	1004	0.483	323	248	571	0.566	144	3.97
Mean	583	345	1263	0.461	267	292	559	0.478	148	3.78

Panel B: Clean sample

Year	Upgrades	Downgrades	Total	%(Upgrades)	Stocks	Revisions Per Stock
		Revisions				
2001	60	75	135	0.444	163	0.83
2002	134	135	269	0.498	158	1.70
2003	96	156	252	0.381	153	1.65
2004	117	111	228	0.513	153	1.49
2005	147	186	333	0.441	154	2.16
2006	181	217	398	0.455	154	2.58
2007	211	188	399	0.529	152	2.63
2008	186	249	435	0.428	148	2.94
2009	205	180	385	0.532	145	2.66
2010	173	167	340	0.509	140	2.43
2011	209	193	402	0.520	140	2.87
2012	161	167	328	0.491	134	2.45
2013	143	187	330	0.433	140	2.36
2014	167	119	286	0.584	144	1.99
Mean	156	166	323	0.485	148	2.18
Total	2190	2330	4520			

Table 2

Descriptive statistics for analyst coverage

This table reports descriptive statistics for the number of analysts following each stock, which is sourced from thee I/B/E/S recommendation file.

Year	Analyst Coverage by Stock						
	Stocks	Mean	Median	Min.	Max	25%	75%
2001	103	4.99	4	1	40	2	7
2002	104	7.47	6	1	47	2	11
2003	76	7.08	5	1	42	2	10
2004	93	6.38	4	1	45	2	10
2005	105	6.14	4	1	38	2	8
2006	102	6.91	5	1	39	2	9
2007	109	7.55	6	1	30	2	11
2008	103	7.47	6	1	46	3	10
2009	92	7.45	5	1	49	2	11.5
2010	100	7.17	5	1	43	2	10.5
2011	105	7.68	6	1	46	2	11
2012	86	7.20	6	1	33	2	11
2013	84	6.92	5	1	36	2	10
2014	94	5.29	4	1	22	1	8

Table 3

Descriptive statistics for daily net purchase by investor type

This table reports the mean daily net purchase for different investor groups in each year over the sample period. Net purchase is defined as the difference between purchase volume and sell volume, divided by total trade volume. t-statistics are reported in parentheses. ***, ** and * denote statistical significance of 1%, 5%, and 10% respectively.

Year	Net Purchase			
	Domestic Institution	Domestic Individual	Foreign Institution	Foreign Individual
2001	-0.023 (-1.526)	0.085*** (10.562)	-0.001* (-1.733)	-0.040** (-2.081)
2002	-0.042*** (-2.702)	0.091*** (8.851)	-0.001 (-1.551)	-0.001 (-0.071)
2003	-0.065*** (-4.452)	0.038*** (3.590)	-0.001 (-0.785)	0.037** (2.125)
2004	-0.056*** (-3.721)	-0.020** (-2.025)	0.002*** (3.245)	0.029* (1.659)
2005	-0.030* (-1.734)	-0.066*** (-7.242)	0.003*** (2.711)	-0.006 (-0.346)
2006	-0.019 (-1.384)	-0.015** (-2.297)	0.002** (2.370)	0.005 (0.249)
2007	-0.037** (-2.538)	-0.020*** (-2.672)	0.000 (-0.018)	-0.008 (-0.429)
2008	0.021** (2.098)	0.068*** (9.360)	-0.007* (-1.875)	0.055*** (2.949)
2009	0.067*** (3.633)	0.061*** (7.566)	-0.004*** (-5.935)	0.040** (2.589)
2010	0.024* (1.678)	0.061*** (7.569)	-0.003*** (-2.891)	-0.007 (-0.303)
2011	0.054*** (3.209)	0.053*** (5.545)	-0.004*** (-4.086)	-0.020 (-1.087)
2012	0.033* (1.864)	0.085*** (9.326)	-0.002*** (-3.023)	0.005 (0.263)
2013	-0.089*** (-3.599)	0.093*** (9.270)	-0.003 (-1.090)	0.085*** (3.688)
2014	-0.176*** (-4.558)	-0.012 (-0.750)	0.004 (0.494)	-0.074* (-1.754)
Total	-0.023*** (-4.624)	0.036*** (13.259)	-0.001 (-1.410)	0.009* (1.758)

Table 4

Abnormal returns around analysts' recommendation revision release date

This table reports the mean size-adjusted daily abnormal returns around the public release date of analyst revisions. The size-adjusted abnormal returns for firm i at time t is the difference between the daily stock return at time t and daily return of the size portfolio that firm i belongs to at time t. The bottom rows report the cumulative abnormal returns (CARs) across several intervals. The cumulative abnormal return ($CAR\,(p,q)$) is the sum of abnormal returns from $t = p$ to $t=q$. t-statistics are reported in the parentheses. ***, ** and * denote statistical significance of to 1%, 5% , and 10%.

Relative Day	Upgrade (n=2190)		Downgrade (n=2330)	
	AR (%)	t-stat	AR (%)	t-stat
-10	-0.118	(-2.787) ***	0.018	(0.409)
-9	0.000	(0.002)	0.055	(1.182)
-8	-0.055	(-1.294)	0.107	(2.403) **
-7	-0.128	(-2.894) ***	0.028	(0.585)
-6	-0.033	(-0.748)	0.046	(1.052)
-5	-0.074	(-1.559)	0.069	(1.409)
-4	-0.062	(-1.436)	0.048	(0.994)
-3	-0.042	(-0.858)	0.038	(0.344)
-2	0.039	(0.733)	-0.139	(-2.258) **
-1	0.219	(3.179) ***	-0.463	(-6.496) ***
0	0.505	(8.970) ***	-0.383	(-7.137) ***
1	0.181	(4.005) ***	-0.208	(-4.149) ***
2	0.124	(2.797) ***	-0.184	(-3.558) ***
3	-0.046	(-1.098)	-0.046	(-0.982)
4	-0.018	(-0.422)	-0.036	(-0.803)
5	0.049	(1.151)	-0.083	(-1.859) *
6	-0.044	(-0.868)	0.017	(0.415)
7	-0.025	(-0.553)	-0.155	(-3.422) ***
8	0.096	(2.233) **	-0.036	(-0.843)
9	-0.019	(-0.442)	-0.016	(-0.387)
10	-0.041	(-0.986)	0.015	(0.322)

CAR				
(-10, -5)	-0.409*** (-3.903)		0.323*** (3.006)	
(-5, -2)	-0.139 (-1.530)		0.016 (0.108)	
(-2, 2)	1.068*** (8.813)		-1.377*** (-9.567)	
(0, 2)	0.810*** (9.837)		-0.774*** (-8.096)	

Table 5

Abnormal trading volume around analysts' recommendation revision release date

This table reports average abnormal trading volume around the analyst recommendation revision release date in the Nasdaq Helsinki over the sample period from 2001 to 2014. Benchmark trading volume would be the average daily trading volume, scaled by total number of outstanding shares, from four months to one months prior to the recommendation revision. The abnormal trading volume (ATV) is the difference between the value of daily trading volume scaled by total number of outstanding shares, and benchmark. t-statistics are reported in the parentheses. ***, ** and * denote significance level equal to 1%, 5% and 10% respectively.

Relative Day	Upgrade (n=2190)		Downgrade (n=2330)	
	ATV	t-stats	ATV	t-stats
-10	-0.00091	(-2.307) **	-0.00079	(-2.038) **
-9	-0.00074	(-1.734) *	-0.00058	(-1.372)
-8	-0.00071	(-1.426)	0.00063	(0.693)
-7	-0.00037	(-0.620)	0.00153	(1.217)
-6	-0.00107	(-2.617) ***	-0.00068	(-1.772) *
-5	-0.00068	(-1.435)	-0.00066	(-1.583)
-4	-0.00061	(-1.338)	-0.00072	(-1.981) **
-3	-0.00040	(-1.040)	0.00015	(0.277)
-2	0.00062	(0.946)	0.00082	(1.413)
-1	0.00223	(3.038) ***	0.00194	(3.200) ***
0	0.00170	(3.099) ***	0.00151	(2.904) ***
1	0.00124	(2.791) ***	0.00084	(1.949) *
2	0.00258	(4.092) ***	0.00171	(4.032) ***
3	0.00235	(3.604) ***	0.00104	(2.509) **
4	0.00093	(1.823) *	0.00062	(1.129)
5	-0.00014	(-0.334)	0.00065	(1.387)
6	-0.00031	(-0.816)	0.00037	(0.561)
7	0.00005	(0.101)	-0.00005	(-0.130)
8	-0.00053	(-1.289)	-0.00009	(-0.222)
9	-0.00017	(-0.248)	0.00009	(0.129)
10	-0.00028	(-0.628)	-0.00047	(-1.184)

Table 6

Abnormal net purchase around revision release date by investor type

This table reports daily average abnormal net purchase measures surrounding analysts' recommendation revision release dates. Daily net purchase measure is defined as the difference between purchase volume and sell volume, divided by total trading volume. Benchmark net purchase is the average daily net purchase from four months to one month prior to the recommendation release. Abnormal net purchase is the difference between the value of daily net purchase and the benchmark. T-statistics are reported in the parentheses. ***, ** and * denote statistical significance of 1%, 5%, and 10% respectively. The letters a, b and c denote the Wilcoxon signed rank test with statistical significance of 1%, 5%, and 10% respectively.

Panel A: Upgrades (n=2190)

Day	Domestic Institution (1)	Domestic Individual (2)	Foreign Institution (3)	Foreign Individual (4)	Difference (t-stat/Wilcoxon)		
					(1)-(2)	(1)-(3)	(1)-(4)
-10	-0.001 (-0.078)	0.019** (1.970)	0.000 (0.056)	0.002 (0.183)	-0.020 (-1.216)	-0.001 (-0.088)	-0.003 (-0.176)
-9	0.010 (0.700)	0.018** (1.988)	-0.007* (-1.657)	0.007 (0.606)	-0.008 (-0.511)	0.017 (1.125)	0.003 (0.152)
-8	0.022 (1.578)	0.006 (0.671)	-0.002 (-0.389)	0.011 (0.937)	0.015 (0.930)	0.023c (1.569)	0.011 (0.606)
-7	0.036** (2.536)	0.054*** (5.698)	-0.005 (-1.198)	0.007 (0.572)	-0.019 (-1.118)	0.041***a (2.693)	0.029 (1.583)
-6	0.024* (1.700)	0.023** (2.440)	-0.007* (-1.816)	-0.011 (-0.920)	0.001 (0.059)	0.031**b (2.066)	0.035* (1.908)
-5	0.026* (1.881)	0.038*** (3.957)	-0.010** (-2.277)	0.009 (0.747)	-0.012 (-0.706)	0.036**a (2.390)	0.018 (0.981)
-4	0.047*** (3.318)	0.037*** (3.894)	-0.002 (-0.591)	0.003 (0.264)	0.010 (0.584)	0.049***a (3.259)	0.043**a (2.383)
-3	0.018 (1.299)	0.027*** (2.820)	-0.010** (-2.354)	-0.018 (-1.484)	-0.009 (-0.534)	0.028*b (1.852)	0.036*b (1.949)
-2	0.047*** (3.304)	0.019** (2.018)	0.000 (0.029)	-0.006 (-0.491)	0.028*c (1.660)	0.047***a (3.083)	0.053***a (2.890)
-1	0.024* (1.692)	0.014 (1.520)	-0.003 (-0.761)	-0.005 (-0.453)	0.010 (0.571)	0.027*b (1.778)	0.029c (1.630)
0	0.032** (2.241)	0.021** (2.160)	-0.010** (-2.358)	-0.004 (-0.301)	0.011 (0.650)	0.041***a (2.740)	0.035*c (1.896)
1	0.028* (1.957)	0.017* (1.782)	-0.002 (-0.581)	-0.002 (-0.176)	0.011 (0.643)	0.030**b (1.979)	0.030c (1.625)
2	0.025* (1.718)	0.000 (0.025)	-0.003 (-0.713)	-0.009 (-0.781)	0.024 (1.449)	0.028*b (1.788)	0.034*c (1.853)
3	0.063*** (4.394)	-0.038*** (-3.983)	0.000 (-0.016)	-0.011 (-0.971)	0.101***a (6.003)	0.063***a (4.076)	0.075***a (4.118)
4	0.041*** (2.935)	-0.010 (-1.099)	0.002 (0.365)	0.004 (0.364)	0.051***a (3.062)	0.039***a (2.628)	0.037**c (2.000)
5	0.038*** (2.667)	-0.018* (-1.917)	-0.007 (-1.626)	-0.010 (-0.833)	0.056***a (3.322)	0.045***a (2.937)	0.048***a (2.619)
6	0.036** (2.515)	-0.010 (-1.073)	0.004 (0.860)	0.008 (0.668)	0.046***a (2.748)	0.032**b (2.116)	0.028 (1.534)
7	0.019 (1.339)	-0.016* (-1.698)	0.000 (-0.119)	-0.022* (-1.924)	0.035**b (2.110)	0.019 (1.278)	0.041**b (2.245)
8	0.008 (0.566)	-0.021** (-2.190)	-0.002 (-0.477)	-0.007 (-0.639)	0.029*c (1.728)	0.010 (0.655)	0.016 (0.849)
9	0.017 (1.179)	-0.019* (-1.924)	-0.002 (-0.615)	0.001 (0.122)	0.036**b (2.104)	0.019 (1.261)	0.015 (0.815)
10	0.049*** (3.446)	-0.008 (-0.772)	-0.003 (-0.640)	0.010 (0.872)	0.056***a (3.304)	0.051***a (3.387)	0.038**c (2.080)

Panel B: Downgrades (n=2330)

Day	Domestic Institution (1)	Domestic Individual (2)	Foreign Institution (3)	Foreign Individual (4)	Difference (t-stat/Wilcoxon)		
					(1)-(2)	(1)-(3)	(1)-(4)
-10	0.007 (0.538)	-0.007 (-0.807)	0.001 (0.215)	0.008 (0.698)	0.015 (0.903)	0.006 (0.431)	-0.001 (-0.037)
-9	-0.021 (-1.632)	-0.035*** (-3.747)	0.005 (1.187)	0.005 (0.487)	0.013 (0.854)	-0.027*c (-1.861)	-0.027 (-1.573)
-8	-0.018 (-1.382)	-0.011 (-1.205)	0.001 (0.248)	-0.028** (-2.574)	-0.007 (-0.434)	-0.019 (-1.353)	0.010 (0.604)
-7	-0.006 (-0.496)	-0.025*** (-2.729)	0.007* (1.694)	-0.009 (-0.799)	0.018 (1.163)	-0.014 (-0.976)	0.003 (0.147)
-6	-0.024* (-1.835)	-0.023** (-2.421)	0.007 (1.604)	-0.014 (-1.273)	-0.002 (-0.106)	-0.031**c (-2.158)	-0.010 (-0.574)
-5	-0.005 (-0.413)	-0.030*** (-3.101)	0.009** (2.188)	0.009 (0.823)	0.024 (1.499)	-0.015 (-1.011)	-0.015 (-0.858)
-4	-0.024* (-1.825)	-0.023** (-2.445)	0.002 (0.474)	0.000 (0.004)	-0.001 (-0.065)	-0.026* (-1.816)	-0.024 (-1.436)
-3	-0.013 (-0.985)	-0.019** (-2.040)	0.011*** (2.753)	-0.012 (-1.034)	0.005 (0.335)	-0.025* (-1.687)	-0.002 (-0.095)
-2	-0.020 (-1.477)	-0.010 (-0.981)	0.003 (0.655)	-0.001 (-0.078)	-0.010 (-0.637)	-0.023 (-1.555)	-0.019 (-1.087)
-1	-0.032** (-2.374)	-0.014 (-1.480)	0.001 (0.189)	0.003 (0.308)	-0.018 (-1.112)	-0.033**b (-2.251)	-0.035**c (-1.999)
0	-0.037*** (-2.772)	0.001 (0.122)	0.006 (1.342)	0.024** (2.093)	-0.038**b (-2.385)	-0.043***a (-2.943)	-0.061***a (-3.469)
1	-0.015 (-1.135)	0.012 (1.260)	-0.003 (-0.620)	-0.010 (-0.947)	-0.027*c (-1.666)	-0.013 (-0.868)	-0.005 (-0.279)
2	0.005 (0.370)	-0.002 (-0.231)	-0.001 (-0.234)	0.007 (0.575)	0.007 (0.451)	0.006 (0.409)	-0.001 (-0.085)
3	-0.024* (-1.806)	0.027*** (2.849)	0.001 (0.122)	-0.011 (-0.971)	-0.051***a (-3.149)	-0.025* (-1.697)	-0.013 (-0.749)
4	0.009 (0.651)	0.017* (1.786)	-0.003 (-0.667)	0.014 (1.221)	-0.008 (-0.500)	0.012 (0.799)	-0.005 (-0.280)
5	-0.007 (-0.504)	0.012 (1.280)	0.004 (0.988)	0.012 (1.030)	-0.019 (-1.157)	-0.011 (-0.774)	-0.018 (-1.039)
6	0.003 (0.217)	-0.003 (-0.274)	-0.006 (-1.269)	-0.003 (-0.260)	0.005 (0.339)	0.009 (0.604)	0.006 (0.331)
7	0.011 (0.830)	0.009 (0.978)	-0.004 (-0.899)	-0.021* (-1.861)	0.002 (0.119)	0.015 (1.035)	0.032* (1.835)
8	-0.001 (-0.037)	0.010 (1.082)	0.003 (0.721)	-0.008 (-0.687)	-0.011 (-0.671)	-0.004 (-0.249)	0.007 (0.405)
9	0.003 (0.226)	-0.012 (-1.273)	0.002 (0.535)	0.005 (0.478)	0.015 (0.938)	0.001 (0.050)	-0.002 (-0.132)
10	0.000 (0.023)	-0.004 (-0.375)	-0.005 (-1.173)	0.010 (0.916)	0.004 (0.231)	0.006 (0.380)	-0.010 (-0.554)

Table 7
Abnormal returns surrounding recommendation revision release date
This table reports mean size-adjusted abnormal returns around the analyst recommendation revision release date over three periods: Pre-MAD / Pre-MiFID (1 January 2001 – 30 June 2005), Post-MAD / Pre-MiFID (1 July 2005 – 31 October 2007) and Post-MAD / Post-MiFID (1 November 2007 – 31 December 2014). The size-adjusted abnormal return for firm i at time t is the difference between the daily stock return in time t and daily return of the size portfolio that firm i belongs to in time t. T-statistics are reported in the parentheses. ***, ** and * denote statistical significance of 1%, 5%, and 10% respectively.

Relative Day	Pre-MAD & Pre-MiFID (1)		Post-MAD & Pre-MiFID (2)		Post-MAD & Post-MiFID (3)	
	Upgrade (N=464)	Downgrade (N=561)	Upgrade (N=454)	Downgrade (N=483)	Upgrade (N=1272)	Downgrade (N=1286)
-10	-0.148 (-1.348)	-0.006 (-0.053)	-0.029 (-0.352)	0.040 (0.573)	-0.139*** (-2.607)	0.020 (0.337)
-9	0.193* (1.804)	-0.055 (-0.498)	-0.125 (-1.258)	0.232*** (3.077)	-0.026 (-0.451)	0.037 (0.587)
-8	-0.102 (-1.030)	0.078 (0.848)	-0.157 (-1.556)	0.012 (0.172)	-0.002 (-0.036)	0.154** (2.400)
-7	0.021 (0.175)	-0.141 (-1.167)	-0.179** (-2.076)	0.084 (1.134)	-0.164*** (-3.074)	0.080 (1.298)
-6	-0.043 (-0.419)	-0.064 (-0.621)	-0.003 (-0.041)	0.070 (0.875)	-0.041 (-0.660)	0.085 (1.471)
-5	-0.123 (-1.244)	-0.101 (-0.775)	-0.090 (-0.987)	0.011 (0.125)	-0.050 (-0.764)	0.165*** (2.829)
-4	-0.098 (-1.022)	0.046 (0.366)	-0.020 (-0.245)	-0.065 (-0.892)	-0.064 (-1.083)	0.091 (1.464)
-3	-0.165 (-1.522)	-0.380*** (-3.149)	-0.075 (-0.798)	0.102 (1.098)	0.015 (0.222)	0.197 (1.033)
-2	0.395*** (2.858)	-0.139 (-0.967)	-0.006 (-0.068)	-0.217 (-1.510)	-0.075 (-1.123)	-0.110 (-1.466)
-1	0.384*** (2.753)	-0.499*** (-3.546)	0.115 (0.947)	-0.141 (-0.856)	0.196** (2.000)	-0.568*** (-5.971)
0	0.192* (1.740)	-0.353*** (-3.405)	0.312** (2.524)	-0.170 (-1.519)	0.689*** (9.052)	-0.476*** (-6.346)
1	0.061 (0.617)	-0.105 (-1.001)	0.141 (1.565)	-0.072 (-0.596)	0.239*** (3.919)	-0.304*** (-4.746)
2	0.172* (1.71)	-0.023 (-0.193)	0.193** (2.554)	-0.222*** (-2.745)	0.082 (1.335)	-0.240*** (-3.322)
3	-0.108 (-1.085)	0.134 (1.297)	0.120 (1.517)	-0.201** (-2.336)	-0.083 (-1.490)	-0.067 (-1.029)
4	-0.268*** (-2.778)	-0.060 (-0.658)	0.058 (0.791)	-0.103 (-1.286)	0.047 (0.810)	0.000 (-0.001)
5	0.032 (0.330)	0.141 (1.512)	0.032 (0.415)	-0.174** (-2.026)	0.061 (1.058)	-0.146** (-2.374)
6	-0.148 (-1.576)	-0.018 (-0.183)	-0.047 (-0.645)	-0.039 (-0.494)	-0.004 (-0.055)	0.054 (0.979)
7	-0.239*** (-2.614)	-0.203* (-1.877)	0.084 (1.243)	-0.167** (-2.005)	0.014 (0.219)	-0.129** (-2.178)
8	0.306*** (2.752)	-0.084 (-0.842)	0.047 (0.696)	-0.032 (-0.402)	0.036 (0.643)	-0.016 (-0.289)
9	0.098 (0.987)	-0.097 (-0.973)	-0.018 (-0.189)	-0.073 (-1.008)	-0.062 (-1.158)	0.041 (0.758)
10	-0.068 (-0.714)	-0.004 (-0.044)	-0.142* (-1.707)	0.032 (0.441)	0.005 (0.091)	0.017 (0.245)

Table 8

Summary trading statistics for domestic individual investors

This table reports a summary of daily trading statistics for two types of domestic individual investors. Investor type A represents the domestic individual investors who have the top 10% annual dollar volume within the pre-event window for revisions (Day [-10,-1]). Investor type B represents the remaining domestic individual investors. Trading volume is the sum of daily buy and sell volume for each investor group. Dollar volume is the sum of daily trading volume times traded price for each transaction. Daily net purchase measure is the difference between the purchase volume and sell volume, divided by total trading volume.

Panel A: Whole Sample				
Investor	Trading Volume	Dollar Volume	Net Purchase	t (Net Purchase)
A	6817218.880	53744052.600	0.010	3.784
B	3060933.505	13418008.090	0.111	27.381

Panel B: Upgrades (N=2190)				
Investor	Trading Volume	Dollar Volume	Net Purchase	t (Net Purchase)
A	165334.620	1602714.880	-0.015	-6.433
B	31117.266	243707.500	0.058	22.197

Panel C: Downgrades (N=2330)				
Investor	Trading Volume	Dollar Volume	Net Purchase	t (Net Purchase)
A	156300.652	1565458.690	-0.027	-11.148
B	35444.486	242527.450	0.046	17.679

Table 9

Abnormal net purchase around revision release dates by domestic individual investor type

This table reports daily average abnormal net purchase measures surrounding analyst revision release dates for two types of domestic individual investor types. Investor type A represents the domestic individual investors who have the top 10% annual dollar volume within the pre-event window for revisions (Day [-10,-1]). Investor type B represents the remaining domestic individual investors. Daily net purchase measure is the difference between the purchase volume and sell volume, divided by total trading volume. Benchmark net purchase is the average daily net purchase from four months to one month prior to the recommendation release. Abnormal net purchase is the difference between daily net purchase and the benchmark. T-statistics are reported in the parentheses. ***, ** and * denote statistical significance of 1%, 5%, and 10% respectively. The letters a, b and c denote the Wilcoxon signed rank test with statistical significance of 1%, 5%, and 10% respectively.

Day	Upgrades (N=2190)			Downgrades (N=2330)		
	Domestic Individual A (1)	Domestic Individual B (2)	(1)-(2)	Domestic Individual A (1)	Domestic Individual B (2)	(1)-(2)
-10	0.014 (1.272)	0.035*** (3.117)	-0.021b (-1.583)	-0.005 (-0.487)	-0.004 (-0.405)	-0.001 (-0.073)
-9	0.000 (0.041)	0.056*** (5.037)	-0.055***a (-4.203)	-0.041*** (-3.752)	-0.032*** (-2.924)	-0.009 (-0.689)
-8	-0.002 (-0.166)	0.035*** (3.139)	-0.037***a (-2.851)	-0.017 (-1.598)	-0.003 (-0.259)	-0.015 (-1.099)
-7	0.045*** (3.955)	0.079*** (7.047)	-0.035**a (-2.538)	-0.03*** (-2.721)	-0.009 (-0.848)	-0.020c (-1.488)
-6	0.022** (1.993)	0.038*** (3.452)	-0.016b (-1.236)	-0.031*** (-2.855)	-0.009 (-0.845)	-0.022* (-1.671)
-5	0.022* (1.951)	0.055*** (4.842)	-0.033**a (-2.518)	-0.033*** (-2.893)	-0.014 (-1.259)	-0.019 (-1.406)
-4	0.026** (2.309)	0.061*** (5.448)	-0.036***a (-2.743)	-0.028** (-2.493)	-0.006 (-0.581)	-0.021 (-1.592)
-3	0.027** (2.373)	0.062*** (5.429)	-0.036***a (-2.664)	-0.017 (-1.534)	-0.019* (-1.679)	0.002 (0.163)
-2	0.006 (0.542)	0.049*** (4.251)	-0.043***a (-3.420)	-0.018 (-1.595)	0.002 (0.190)	-0.020c (-1.574)
-1	0.000 (0.019)	0.041*** (3.523)	-0.041***a (-3.122)	-0.014 (-1.280)	-0.009 (-0.773)	-0.005 (-0.399)
0	0.023** (2.104)	0.037*** (3.175)	-0.014 (-1.066)	0.007 (0.701)	-0.014 (-1.263)	0.021*c (1.688)
1	0.017 (1.587)	0.024** (2.047)	-0.007 (-0.512)	0.021* (1.922)	-0.005 (-0.425)	0.026**c (1.998)
2	-0.006 (-0.590)	0.026** (2.208)	-0.032**a (-2.455)	-0.008 (-0.743)	0.000 (-0.020)	-0.008 (-0.613)
3	-0.046*** (-4.235)	-0.002 (-0.139)	-0.044***a (-3.411)	0.023** (2.124)	0.024** (2.143)	-0.001 (-0.067)
4	-0.020* (-1.830)	0.004 (0.352)	-0.024*b (-1.841)	0.022** (2.007)	0.010 (0.843)	0.013 (0.970)
5	-0.022* (-1.957)	-0.003 (-0.276)	-0.018c (-1.361)	0.025** (2.303)	0.001 (0.086)	0.024* (1.772)
6	-0.015 (-1.317)	-0.001 (-0.104)	-0.013 (-0.992)	-0.003 (-0.244)	-0.001 (-0.094)	-0.002 (-0.126)
7	-0.023** (-2.090)	-0.008 (-0.705)	-0.015 (-1.107)	0.020* (1.837)	0.006 (0.502)	0.014 (1.052)
8	-0.018 (-1.563)	-0.019 (-1.637)	0.001 (0.108)	0.009 (0.762)	-0.004 (-0.359)	0.013 (0.937)
9	-0.014 (-1.250)	-0.019 (-1.559)	0.005 (0.351)	-0.015 (-1.308)	-0.017 (-1.537)	0.003 (0.208)
10	-0.019* (-1.663)	0.016 (1.342)	-0.035***b (-2.601)	0.005 (0.418)	-0.003 (-0.270)	0.008 (0.562)

Appendix

Appendix A: Abnormal returns adjusted by market model surrounding recommendation revision dates

This table reports mean abnormal returns adjusted by market model around the analyst recommendation revision dates in the Nasdaq Helsinki over the sample period 2001–2014. Abnormal returns are estimated from the market model: $AR_{i,t} = R_{i,t} - \hat{a}_i - \hat{\beta}_i R_{m,t}$ where $R_{i,t}$ is the return on stock i on day t and $R_{m,t}$ is the market return on OMX Helsinki Index on day t. Results are presented for three different estimation windows: 4 months to 1 month prior to the revisions, 6 months to 1 month prior to the revisions, and 12 months to 1 month prior to the revisions. ***, ** and * denote statistical significance at 1%, 5%, and 10% respectively.

Day	(1) [-4 Months, -1 Month]		(2) [-6 Months, -1 Month]		(3) [-12 Months, -1 Month]	
	Upgrade	Downgrade	Upgrade	Downgrade	Upgrade	Downgrade
-10	-0.078* (-1.731)	0.051 (1.127)	-0.082* (-1.826)	0.054 (1.199)	-0.088** (-1.988)	0.063 (1.409)
-9	0.015 (0.321)	0.092* (1.889)	0.014 (0.307)	0.110** (2.285)	0.008 (0.173)	0.116** (2.413)
-8	-0.035 (-0.774)	0.094** (2.047)	-0.042 (-0.958)	0.107** (2.323)	-0.045 (-1.037)	0.114** (2.501)
-7	-0.128*** (-2.773)	0.032 (0.644)	-0.127*** (-2.747)	0.040 (0.819)	-0.133*** (-2.899)	0.050 (1.031)
-6	-0.014 (-0.297)	0.048 (1.049)	-0.006 (-0.138)	0.057 (1.243)	-0.017 (-0.360)	0.059 (1.311)
-5	-0.098* (-1.938)	0.041 (0.813)	-0.092* (-1.845)	0.055 (1.102)	-0.099** (-1.987)	0.057 (1.143)
-4	-0.064 (-1.432)	0.045 (0.917)	-0.069 (-1.574)	0.052 (1.051)	-0.065 (-1.493)	0.057 (1.151)
-3	-0.057 (-1.129)	0.068 (0.616)	-0.059 (-1.188)	0.068 (0.608)	-0.078 (-1.579)	0.065 (0.582)
-2	0.062 (1.132)	-0.128** (-2.053)	0.062 (1.153)	-0.116* (-1.852)	0.049 (0.910)	-0.113* (-1.801)
-1	0.207*** (2.880)	-0.485*** (-6.670)	0.210*** (2.933)	-0.483*** (-6.636)	0.196*** (2.754)	-0.471*** (-6.482)
0	0.516*** (8.819)	-0.388*** (-6.920)	0.523*** (9.016)	-0.373*** (-6.714)	0.510*** (8.848)	-0.370*** (-6.677)
1	0.220*** (4.644)	-0.207*** (-3.959)	0.215*** (4.589)	-0.205*** (-3.959)	0.203*** (4.347)	-0.208*** (-4.036)
2	0.14*** (3.083)	-0.175*** (-3.201)	0.131*** (2.929)	-0.165*** (-3.037)	0.135*** (3.040)	-0.158*** (-2.936)
3	-0.045 (-0.990)	-0.088* (-1.793)	-0.045 (-1.016)	-0.082* (-1.698)	-0.046 (-1.050)	-0.076 (-1.583)
4	-0.037 (-0.840)	-0.057 (-1.252)	-0.032 (-0.731)	-0.046 (-1.009)	-0.030 (-0.698)	-0.043 (-0.963)
5	-0.009 (-0.190)	-0.111** (-2.365)	-0.004 (-0.100)	-0.110** (-2.380)	-0.009 (-0.206)	-0.106** (-2.306)
6	-0.058 (-1.085)	-0.040 (-0.890)	-0.063 (-1.192)	-0.036 (-0.814)	-0.078 (-1.487)	-0.029 (-0.666)
7	-0.032 (-0.692)	-0.169*** (-3.610)	-0.035 (-0.776)	-0.164*** (-3.527)	-0.038 (-0.831)	-0.160*** (-3.474)
8	0.083* (1.809)	-0.064 (-1.438)	0.082* (1.807)	-0.058 (-1.328)	0.075* (1.661)	-0.057 (-1.311)
9	-0.025 (-0.569)	-0.033 (-0.790)	-0.023 (-0.522)	-0.023 (-0.546)	-0.034 (-0.782)	-0.021 (-0.500)
10	-0.103** (-2.342)	-0.011 (-0.219)	-0.104** (-2.378)	0.007 (0.136)	-0.104** (-2.422)	0.014 (0.294)