The Streaming News Effect on Investor Behavior surrounding Analyst Stock Revision Announcement.

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We investigate media influence on stock return that are revised by sell-side analysts. Our main findings are twofold. First, post-announcement returns depend on whether the stock is covered by the media. Media-covered stocks demonstrate weaker post-announcement returns than their non–media-covered counterparts. Second, for media covered event samples, we create a sentiment proxy using a unique news word count method and investigate whether pre-event sentiment affects post-event returns. Our results indicate that pre-event sentiment indicate the short run investor behavior and affect the post-announcement return in a significant manner.

"Fundamentals might be good for the first third or first 50 or 60 percent of a move, but the last third of a great bull market is typically a blow-off, whereas the mania runs wild and prices go parabolic."

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Introduction

In an efficient market, security prices at any given time fully reflect all available information. A priori, there is good reason to believe that stock markets are efficient, because such markets are paradigmatic examples of competition. Yet, rather than adjusting immediately to news surprises, stock prices tend to drift over time in the same direction as the initial surprise. When sell-side analyst changes ratings of stocks, short-run drift occurs. Previous research suggests two explanations for the existence and persistence of drift. First, the persistence of this anomaly may be due to high transaction costs (limits of arbitrage). Thus, mispricing persists only if market frictions are severe enough to prevent arbitrageurs from exploiting it. Barber et al. (2001), for example, present evidence that supports this view. They find significant drift in analysts' post-recommendation stock price returns; however, they conclude that their anomaly-based trading strategies do not reliably beat a market index after accounting for transactions costs. Alternatively, the drift may be a function of whether investors pay attention to the stock or the type of information investors receive about the stock. The second explanation comprises a behavioral view that investors face a formidable search problem. Barber and Odean (2008) predict that individual investors actively buy stocks on high attention days. They argue that professional investors as a whole (inclusive of market-makers) will exhibit a lower tendency to buy, rather than sell, on high-attention days and a reverse tendency on low-attention days. This will create a short-term overreaction followed by subsequent reversal.

The goal of this research is to deepen our understanding of what type of information flows drive event-related anomalies. Interest in the relations between media and the market has been growing among both researchers and practitioners (e.g., Klibanoff et al. (1998), Tetlock (2007), Tetlock et al. (2008)). In the hedge fund industry, a London-based hedge fund launched a Twitter-based investment fund based on methodology presented by Bollen et al. (2010). We contribute to this strand of research by examining the relation between post-event abnormal stock returns and the media. Specifically, we look at news coverage of stocks that face analysts rating revision (obvious good/bad news about the stock) and how attention grabbing and non-attention grabbing stocks respond to the news. Our approach is similar to that of Fand and Peress (2009) who examined the cross-sectional difference in monthly returns depending on the news coverage but different from them in three ways. First, we examine not only headlines, but also massive and comprehensive amounts of news disseminated by the major financial information vendor in Japan. These data are more appropriate than newspaper articles because they affect market participants directly on the real time basis. Second, we look into the contents of the news and determine mass media sentiment. Specifically, we are interested in the mass media nuance and its effect on stock prices surrounding events because such nuances are to be shared by the crowd

of investors. To examine how mass media mood affects subsequent stock market returns, we categorize market news based on the number of positive and negative words appearing in the news articles.[1] Third, we focus on event-related abnormal returns to investigate how investors react to events in conjunction with the prevailing market news.

Our prediction is that upon arrival of upgrading news, attention-grabbing stocks would go up less than no-attention grabbing (non-media covered) counterparts. Presumably, there are two effects at play. First, Bayesian updating investors would be less surprised upon the news arrival when they are exposed to any news in the past. Second, as pointed out by Barber and Odean (2008), attention grabbing stocks are likely to be bought by individual investors and sold by professional traders. Because professional traders only sell above the fair value, those stocks are overvalued at the time of the event, thus limited response to good news. Our prediction is symmetrical in the case of downgrades. Bayesian updating investors would be less surprised when the firm is mentioned in the news. Non-media covered stocks are expected to go down more than media-covered counterparts due to the surprise effect of the event news.

As a preliminary examination, we calculated the post-announcement abnormal returns of stocks whose ratings are revised by sell-side analysts. Using a standard event study framework, we find a significant abnormal price reaction even after the first tradable price on the day following the announcement. We also find significant abnormal returns using industry, size, and book-to-market control firms as a benchmark. Consistent with prior research (Stickel (1995), Womack (1996)), stocks upgraded by analysts demonstrate limited or small-scale post-announcement drift, while stocks that are downgraded indicate a prolonged downward drift.

Next, we collected a massive amount of news electronically from the QUICK[2] database. Our news sample includes articles from QUICK news, NQN news, and *Nihon Keizai Shimbun* news between January 2008 and December 2012. A total of 773,386 news articles were obtained, consisting of 10,068,140 sentences and 56,358,567 words. Based on these news articles, we classified our sample firms (7,174 firm events) into two groups: media covered (5,460 firm events) and non-media covered (1,714 firm events). If a news report covers a firm during the 10 business days prior to its event date, we categorize the firm as media covered and non-media covered otherwise. Consistent with our prediction, we find media coverage affects post-announcement abnormal

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1 Negative and positive terms are called "polarity" words. For details as to how we define polarity, please see the Appendix.

2 QUICK is the dominant market information vendor in Japan. Most Japanese fund managers and traders use QUICK in addition to Reuters and Bloomberg, primarily because its news coverage of the Japanese markets is the most comprehensive.

returns. Our results in the short-term post-announcement return analysis show that stocks with mentioned in the media demonstrate less post-announcement return difference than firms with no media mention. Upgraded stocks demonstrate a positive post-announcement return, on average, but most of the positive returns are for firms without media attention. For downgraded events, a negative post-announcement return appears stronger for stocks without media attention than for their media-covered counterparts.

Finally, we further categorized the media-covered samples (6,353 firm events) into three groups as positive, neutral and negative. When a stock is quoted in an article that contains more negative words than positive, as defined by our dictionary, the stock is categorized as having negative sentiment. If they offset each other, neutral, and more positive word than negative, positive. Negativity and positivity are defined as the simple addition of each type of word's appearance in the news for the stock.

Using this unique sentiment scoring method, we create a sentiment proxy and observed the post-event performance of three classes (positive, neutral and negative) of stocks based on the sentiment. We find that downgraded firms show little difference in returns regardless of their sentiment class. Upgraded stocks, however, show a difference; stocks with positive sentiment demonstrate almost zero post-announcement return while neutral and negative sentiment stocks marginally gain value. Attention-grabbing stocks with positive sentiment are bought by individual investors and overvalued at the time of the announcement. Thus the subsequent rise is limited. Differences in pre-event returns among three classes are more conspicuous and are commensurate with the level of media sentiment. Before the upgrading events, stocks with positive sentiment demonstrate the bull run up to the announcement generating large positive abnormal return, neutral sentiment class do not show any difference and the negative sentiment class shows slightly negative. Among the downgraded samples, negative class demonstrates a large negative abnormal return, neutral class zero and positive class positive. This finding indicates that mining news articles prior to the announcements can potentially predict stock returns.

The remainder of this paper is organized as follows. Section I reviews the literature. Section II describes our data. Section III explains our methodology. Section IV presents and discusses the main empirical results. In Section V, does the robustness check of our results. Section VI concludes the paper.

I. Literature review

Earlier papers in the literature include that of Klibanoff et al. (1998), who show that country-specific news reported on the front page of *The New York Times* affects the

pricing of closed-end country funds. The authors find that during weeks of front-page news, price movements are more closely related to fundamentals. They therefore argue that news events lead some investors to react more quickly. More recently, Tetlock (2007) analyzed the linguistic content of the mass media and reports that media pessimism predicts downward pressure and a subsequent reversal. Tetlock et al. (2008) further document that the fraction of negative words used in news stories predicts earnings and stock returns. These findings suggest that qualitative information embedded in news stories contributes to the efficiency of stock prices.

Among papers that examine broadly defined media exposure, ours is the first that documents post-event returns and their relation with media coverage and its nuance. Several recent papers document a positive relation between media and liquidity but fail to find significant return differentials. For example, Antweiler and Frank (2004) find that stock messages predict market volatility but their effect on returns is small. Grullon et al. (2004) document that firms with larger advertising expenditures have more liquid stocks. Frieder and Subrahmanyam (2005) report that individuals are more likely to hold stocks with strong brand recognition. On the other hand, Fand and Peress (2009) succeed in finding return differentials using media coverage. They examine cross-sectional return patterns and find that media-covered stocks have lower returns than non–media-covered stock. Chan (2003) examines momentum and reversal patterns following large price moves with and without accompanying news and supports the same findings.

Our paper is closely related to those of Fand and Peress (2009) and Chan (2003) but differs in one important aspect: These authors focus on news coverage and headline news, respectively, but do not distinguish between news positivity and negativity. Since assessment of true value is difficult and investors overreact to private information and underreact to public information (Daniel et al. (1998)), how a news article is written is as important as the factual information it conveys. We obtained data mainly from the major financial information vendor QUICK. To measure news sentiment, we enumerate negative and positive words in the relevant news articles that are electronically disseminated through QUICK. Another distinction is that Fand and Peress (2009) examine cross-sectional differences in returns with and without news coverage and Chan (2003) looks at market reactions to news in time (and the differences therein between winners and losers), whereas we examine post-event differences in returns.

Our paper is also related to that of Barber and Odean (2008), who show that individual investors are the net buyers of attention-grabbing stocks, such as stocks in the news. These authors argue that individuals face difficulties choosing stocks to buy from a large pool of candidates; thus, attention-grabbing stocks such as those in the news are more likely to enter their choice set. Our evidence implies that investors trade among

attention-grabbing stocks but the direction of their investment decisions is affected by news sentiment.

II. Data

Our sample consists of those companies subject to analyst recommendation revisions. The recommendation revisions are identified using Bloomberg's database. We use Bloomberg only to identify analysts' rating revisions because QUICK does not offer such data. The sample firms are listed on the Tokyo Stock Exchange (TSE) and the Japan Securities Dealers Association Quotation System (JASDAQ). The recommendation revisions encompass the period from January 1, 2008, through December 31, 2012. The Bloomberg database includes, among other items, revision dates, new ratings, identifiers for the brokerage house issuing the recommendation, and the identity of the analyst writing the report (if known). Recommendations are expressed by a rating between one and five. A rating of one reflects a strong buy recommendation, two a buy, three a hold, four a sell, and five a strong sell. This five-point scale is commonly used by analysts. If an analyst uses a different scale, we convert the analyst's rating to our five-point scale.

Another characteristic of our data is that the data made available to us are incomplete. Certain brokerage houses have entered into agreements that preclude their recommendations from being distributed by Bloomberg to anyone other than their clients. Consequently, although the recommendations of the largest and most well-known brokers are included by Bloomberg, they are not part of our dataset. Our event data originally contain 15,796 observations for the period between January 1, 2008, and December 31, 2012. These data include a case of double count such as follows. On day t, a company A is upgraded by an analyst X. A different analyst Y downgrades the company on the following day t+1. In this case, the post-event performance of the first event sample is affected by the mixture of two different rating revisions. We exclude such samples and our total clean event sample subject to analysis is 7,174 observations.

We also use the number of electronic news articles about a stock to proxy for the stock's overall media sentiment. To collect this information, we systematically searched the QUICK database for articles in our sample referring to the company name. The QUICK database distributes news data from three sources: from the *Nihon Keizai Shimbun*, from QUICK, and from NQN. The news is all from the Nikkei Group but each source has its own characteristics. For example, the *Nihon Keizai Shimbun* news is an electronic version of the newspaper contributed by the writers of Nikkei Inc., while the QUICK news is market focused and contributed by writers from QUICK Inc., a subsidiary of Nikkei Inc. The NQN news is real-time distributed market news contributed by both Nikkei and QUICK writers.

We obtain the company name for each article from the article's sentences. A writer entering a story, on into the news systems, will often manually write the company name and occasionally its four-digit TSE code. The manual input of the company name leads to variations, such as *NTT-Docomo* and *Docomo*. We then match these company names with our code dictionary. When the article provides the company code, we tag the article with that code. We exclude news articles about an industry without specific mention of a company from our analysis. To capture news about a given company, we retain articles with at least one mention of the company. If an article mentions more than one company name, the article is counted multiple times, once for each company mentioned. Table I is the descriptive statistics of our samples.

(Insert Table I here)

We quantify the news media sentiment, that is, its negativity and positivity, with these selected articles. Converting qualitative text into a machine-readable form requires several preliminary steps, but we skip the details in this paper because they are in the realm of computer science. To distinguish whether a story's informational content is positive or negative, one needs to prepare standards against which to classify words and events. Since different groups of people are affected by events differently and have different interpretations of the same events, conflicts can arise. For example, the term *dividend cuts* can be classified as negative by a prevailing dictionary-based algorithm. In contrast, it can be interpreted positively by market analysts who believe this indicates the company is saving money and is therefore better able to repay its debts. To avoid such problems, we produce a dictionary of 3,056, terms classified by experts. We give each firm in our sample a time series sentiment number if there was any news in the 10 calendar days prior to the analysts' recommendation revision event. Sentiment numbers are calculated based on the simple addition and subtraction of the news content about a firm. For example, if negative words outnumber positive words by two, the sentiment number for the firm is -2.

Table II describes the summary statistics of our sample in relation to the news articles and the sentiment score of each sample. We divide our sample firms into three categories using market capitalization. Firms with market capitalization below 10 billion yen (US$111 million at the exchange rate of 90 yen per dollar) are categorized as small, those larger than 10 billion yen and less than 60 billion yen are categorized as medium, and those above 60 billion yen are categorized as large. Of 7,174 recommendation revisions, 5,700 are concentrated on large firms that represent merely one-sixth of all listed companies (of 4,873 listed firms, only 822 large companies are the subject of more than 80% of news articles). As shown in Panel B of Table II, out of 773,386 articles obtained from QUICK, 76,344 appeared during the 10

calendar days prior to the event. We calculate sentiment score based on news during that 10-day period. The score calculation is the simple average of word polarity, with negative words scored as -1 and positive words as +1. A total of 85,615 positive words and 93,579 negative words appeared in the entire collection of news articles on our clean sample firms in the pre-announcement period. Panel C shows the composition of media-covered and non–media-covered samples. Out of 7,174 events, 1,714 were not media covered in the pre-announcement period. The remaining 5,460 events had news coverage; 2,122 events have a positive score, 1,731 events have a negative score, and 1,607 events have a neutral score.

(Insert Table II here)

III. Media coverage and stock returns

This section focuses on the relation between media coverage, media nuance, and post-recommendation stock returns. We first examine the abnormal returns of recommendation revisions and then examine abnormal returns by subdividing the sample firms based on news sentiment.

A. Abnormal returns of stocks revised by sell-side analysts

Analysts deliberately plan most rating revisions and reiterations. These decisions are rarely made in haste. Although analysts act based on public information, the preponderance of the research suggests that market response to rating revisions is considerable. Stickel (1995) and Womack (1996) show that favorable (unfavorable) changes in individual analyst recommendations are accompanied by positive (negative) returns at their announcements. The authors document a post-recommendation stock price drift that lasts up to one month for upgrades and up to six months for downgrades. It appears as while investors can exploit analyst information and generate abnormal profits, obtaining full information about analyst ratings ex ante is difficult. Generally, analysts' rating reports are only accessible to investors if they have account with the issuing broker. In this sense, rating revision information is not completely in the public domain unless it is distributed by a third-party financial information vendor. To conduct an event study based on only news available to the public, we investigate whether analyst rating revisions broadcast by Bloomberg still significantly change subsequent firm value.

Table III indicates the average cumulative abnormal return (CAR) for the three-day event window. The return is calculated from the opening price of the day following the

announcement. An abnormal return is defined as the sample return minus the benchmark return. Panel A of Table III demonstrates the abnormal return based on the market model. We use the Tokyo Stock Price Index as a market portfolio proxy and the beta of each sample is estimated based on its price history during the 200 business days prior to the announcement date. The destination of each upgrade and downgrade is expressed horizontally. We use the O/N call rate as a risk-free rate. Note that rating revisions to neutral, meaning the target stocks perform as well as the market, significantly influence stock prices in both ways. This is consistent with Francis and Soffer (1997), who find that investors react to the rating revision rather than to the rating level itself. Our sample excludes reiterations. The null hypothesis of a zero three-day CAR is tested with conventional *t*-statistics; Table III reports the *p*-values.

It is expected that firms with small market capitalization are affected by analysts more sensitively than other firms. Value stocks tend to outperform growth stocks when the value anomaly is focused by funds[3]; therefore when rating revisions coincide with a "value boom," the abnormal returns of such samples may be inflated. The industry can also be a determinant factor of returns, particularly in the period when sector rotation is active. For example, a prevailing macroenvironment condition such as a weak yen induces investors to invest in export-related industries. To control for such factors, we compare sample firm returns with the respective control firms based on industry, size, and book-to-market ratio.

Panel B shows the abnormal returns computed from each sample firm return minus its respective control firm return. The corresponding control firm is selected according to the following procedure. First, we select firms in the same industry as the sample, using TSE's middle industry classification code. Among stocks in the same industry, we select firms whose market capitalization falls between 70% and 130% of the sample. Lastly, we pick a single stock whose book-to-market ratio is the closest to the firm's. When there is no firm that satisfies these three selection criteria, we drop the industry criterion and repeat the same screening process. For these samples, we use only the size and book-to-market ratio criteria for selection.

The direction of the post-event period return in Table III is consistent with prior findings. Firms that are revised upward gain a positive abnormal return and those revised downward suffer from a negative abnormal return. A total of 7,080 stocks that are revised upward rise, on average, 0.95% (0.84% using control firms) more than expected. Symmetric results are found in downward revisions, with 7,204 firms losing -1.27% (1.16% using control firms), on average, upon downgrade.

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[3] From 2004 through 2006, the Japanese stock market grabbed the attention of foreign investors and the value group of stocks outperformed the growth group by xxx percentage points per year.

(Insert Table III here)

B. Media coverage and post-recommendation returns

This section investigates the post-recommendation returns of firms that gain media attention. In a long-run abnormal return analysis, Fand and Peress (2009) report that high-coverage stocks underperform non–media-covered firms by 0.39% per month (4.8% per year). The authors also examine non-covered and high-coverage stocks separately and find the non-covered stocks generate an alpha, while the high-coverage stocks underperform the market index. They argue that such performance suggests that the media effect is unlikely to be caused by individual (or generally unsophisticated) investors buying attention-grabbing stocks. The authors conclude that stocks in oblivion demonstrate higher returns to compensate for their lack of recognition.

Our analysis of short-run post-recommendation returns indicates the opposite. We find media-covered stocks generate stronger abnormal post-recommendation drift in both directions. Barber and Odean (2008) document that individuals exert buying pressure on attention-grabbing stocks such as those in the news. Our evidence is consistent with this view. Among upgraded stocks, media-covered stocks indicate stronger positive post-recommendation return drift than that of non–media-covered stocks and the difference in the means between media-covered and non–media-covered stocks is statistically significant. Symmetrically, media-covered downgraded stocks demonstrate a more severe negative drift in the same period than their non–media-covered counterparts. The difference between these two groups is statistically significant.[4]

At a glance, non–media-covered stocks respond to upgrades and downgrades in a relatively calm manner. This is consistent with the conjecture that individuals buy upon the arrival of good news (analyst upgrades) and sell upon receipt of bad news (analyst downgrades). If individual investors react to attention-grabbing stocks, the arrival of good news (analyst upgrades) would entice them to go long, while the arrival of bad news (analyst downgrades) would entice them to go short. Figure 1 graphically represents the CARs up to 10 business days in the post-recommendation period. We calculate a return using the first available price after the new level of recommendation becomes public; we therefore use the opening price of the following morning. The benchmark return is the respective control firm's return.

[4] The *p*-values indicate that the null hypothesis of the zero three-day CAR is rejected at the 1% confidence level for both upgrades and downgrades.

(insert Figure 1 here)

C. Media sentiment and post-recommendation returns

Using a collection of *Nihon Keizai Shimbun*, NQN, and QUICK news articles from January 2008 to December 2012 (a total of 1,275,064 articles, or 68,740,386 words), we categorize each article by company name. If the article does not mention a name, we exclude the article from the sample. We also include the date–time of submission (GMT + 0) and occasionally the contributor's name. Of 1,275,064 articles, 773,386 contain at least one company name. We use a market expert and create a dictionary of approximately 3,000 words that classify textual news as positive or negative. Using the dictionary, we check every word in the news and count the number of positive and negative words in each article. A news article is assigned +1 for each positive word and -1 for each negative word. The simple summation of these numbers is defined as the news sentiment score.

We illustrate the methodology with a sequence of news events for the Mitsubishi Corporation (TSE code 8058), a trading company (*Sogo-shosha)* with a market capitalization of 36 billion USD in January of 2012. We define Monday, January 9, 2012, as trading day t - 9, because this is nine calendar days prior to an event (analyst upgrade) on January 18, 2012. On that day, QUICK released a news story related to their airport management business. The story describes the government's new policy to sell the rights to manage domestic airports to the private sector. According to the news, Mitsubishi Corporation had already invested in an infrastructure fund that manages UK airports. On day t - 8, there was no news about the firm, so the number of articles that day is zero. On day t - 7 a story is issued about a copper mining company in Chile that sued the UK-based Anglo-American Co. Ltd. The sentiment score of this day is +1, meaning that the article contained one more positive word than there were negative words. Mitsubishi Corporation had a 24.5% stake in the Chilean mining company. However, what the sentiment score captures is not the aggregate favorability of this news to the Mitsubishi Corporation. Our word count methodology therefore has its own limitations; the sentiment score is not an accurate measure of investor psychology in the contextual meaning of the news. Given these limitations, however, we still believe this methodology produces a good enough proxy when measured with a massive amount of data. On day t - 6, major buying and selling activity was reported and Mitsubishi Corporation was one of the stocks carrying a large buy order at the opening. When a

stock attracts attention with a large price move or trading volume, we then witness news reports that describe how the stock performed. Market news related to Mitsubishi Corporation thus appeared every day until t - 1 and the total sentiment score over the 10-day period, which is the cumulative difference between the positive and negative word counts, is + 6. This means Mitsubishi Corporation's pre-recommendation sentiment is positive. The firm's subsequent three-day CAR after the announcement is 5.03%. This is a typical example of the positive correlation of firm news sentiment with post-recommendation returns.

Table IV reports typical examples of sample stock whose post-announcement return is affected by sentiment in the 10 business days prior to the announcement date.

(Insert table IV here)

Section B tests the hypothesis that investor trading behavior is influenced by how frequently the stock is reminded. By comparing stocks covered by the media and stocks in oblivion, we find that media-covered stocks tend to react to recommendation revisions more keenly than non–media-covered stocks. This section tests the hypothesis that investor trading behavior is influenced by how stocks are covered in the news. Seasholes and Wu (2004) investigate the Shanghai Stock Exchange and find that individual investors are net buyers the day after a stock hits an upper price limit. Furthermore, they document that a higher percentage of purchases is made by first-time buyers on price limit days than on other days. Individual investors, especially first-time buyers, are attracted by the event of hitting a price limit (positive news) and individuals become the net buyers of stocks that catch their attention. It is natural to expect individual investors will be influenced by the tone of the news and will be drawn to buying stocks when these had generated positive news in the recent past.

To test this hypothesis, we segregate our media-covered sample firms into three groups: firms with cumulative negative news scores on the day before an announcement, positive news score and their sample complement (neutral). Figure 2 illustrates the CAR up to 10 days after the event. When stocks are upgraded, firms with positive sentiment do not demonstrate positive abnormal returns except in initial reaction to an announcement. This is because positive news encourages individual investors put in a speculative bid and in the state of overvalued at the time of the announcement and therefore the subsequent rise is limited. Other sample complement does not have this effect. The difference between these two groups is statistically significant.

We do not find the opposite price move when stocks are downgraded. Stocks with a positive, neutral and negative score before an event decline in tandem. The difference among these three classes is statistically insignificant. between positive and

non-positive stocks is statistically significant. This difference in post-event stock performance arises from effect the nuance of the news reported in the pre-announcement period. Because individual investors tend to be play the market from the long position and these investors are affected by the news sentiment. Investor behavior is driven not only by the attention-grabbing effect of news but also by the nuance they convey.

(Insert figure 2 here)

IV. Robustness check

We test whether the post-announcement drift in returns is a mere manifestation of the post-earnings announcement drift (PEAD) anomaly. Briefly, PEAD refers to the fact that earnings announcements with large positive unexpected earnings are followed by an upward drift in security prices, while earnings announcements conveying large negative unexpected earnings are followed by a downward drift in securities prices, with most of the drift concentrated in the six months following the earnings announcement (e.g., Bernard and Thomas (1989, 1990), Abarbanell and Bernard (1992), Chan et al. (1996)). Securities with positive earnings surprises are considered to carry positive sentiment in the pre-event period. Thus, if the PEAD effect is noted, the observed positive abnormal return in the post-event period reflects the mixed effect of PEAD and news sentiment. Similarly, securities with negative earnings surprise are likely to have a negative sentiment score and therefore exhibit a negative earnings drift. To disentangle these two effects, we exclude sample firms whose pre-event news is related to corporate earnings. Specifically, we exclude 3,054 firms whose earnings announcements appeared during the 10-day pre-event period. Our clean sample comprises 4,605 firm upgrade events and 4,489 firm downgrade events.

Table V indicates the post-event CAR up to 10 days after an event. When stocks are upgraded, as described in Figure 1, significant drift occurs. When we divide our sample into media-covered and non–media-covered firms, we find the former to have statistically significant stronger abnormal returns. Table V indicates that the *p*-values are less than 1% for CAR 1 (the CAR from the opening price to the closing price of the day following the announcement) through CAR10 for both upgrades and downgrades. Statistical significance remains intact, even when we limit our sample to the clean sample mentioned above. We subsequently conduct the same comparison for the sentiment score effect on post-event returns. We observe little difference between our

total sample and the clean sample for either upgrades or downgrades. Media coverage intensifies market response to sell-side analysts' rating announcements. Among media-covered firms, sentiment in the news plays an important role in determining how investors react in the post-event period.

(Insert Table V and VI here)

V. Conclusion

We examine the relation between media coverage, media sentiment, and post-event stock returns. We find significant drift in the return on stocks with media coverage: On average, stocks that are not featured in the media outperform other stocks by over 0.9% in the three days after an upgrade announcement and underperform by 0.8% in the three days after a downgrade announcement, even after accounting for industry, size, and book-to-market. Moreover, we find a significant return difference for media-covered stocks because how a stock is featured by the media affects its performance. Among media-covered stocks, those with positive sentiment rise less than those with non-negative sentiment by 0.8% in the three days after an upgrade announcement. These figures are not only statistically significant but also economically large.

We show that the media effect is robust to the well-known PEAD return anomaly. We provide evidence that even excluding samples that have earnings announcement in the pre-event period demonstrated the same reaction in the post-event period. Thus, our finding that stocks with low media coverage exhibit significant positive upward abnormal return when upgraded. Interestingly, media coverage sentiment affects post-event returns (e.g., Tetlock (2007), Tetlock et al. (2008)). The negative correlation between media sentiment score and post-event returns then suggests that investors decide to long and short depending on media sentiment. These observations suggest that mass media's effect on security pricing stems from its ability to not only disseminate information broadly but also shape opinions or form consensus.

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Table I Descriptive Statistics on Analyts' Recommendation Revisions between Jan. 1st 2008 to Dec. 31st 2012.

This table shows the number of rating revision events occurred during our sample period by year. Large firms tend to be revised more than once during the calendar year. Event total indicates the number of revision events during the calendar year including firms that are subject to revision for more than once.

Year	Market	No. of Listed Firms	No. of Covered Firms	Covererage ratio	No. of Firms that are revised	Upward revision	Downward revision	Total
2008	TSE	2,170	973	45%	434	780	1,119	2,097
	JASDAQ	915	147	16%	49	77	121	
2009	TSE	2,282	999	44%	373	835	678	1,586
	JASDAQ	882	149	17%	18	32	41	
2010	TSE	2,691	1,484	55%	289	652	500	1,203
	JASDAQ	996	597	60%	11	22	29	
2011	TSE	2,083	1,514	73%	284	521	543	1,114
	JASDAQ	961	688	72%	11	20	30	
2012	TSE	2,094	1,458	70%	273	479	651	1,174
	JASDAQ	919	595	65%	7	18	26	
Total					1,749	3,436	3,738	7,174

Table II Summary Statistics of Our Sample Firms, News Articles and the Sentiment

Panel A indicates the total number of events and articles covered. Panel B shows the description of news articles

Panel A: News Articles with a Company Name

		No. of stocks	No.of events	No. of articles	No. of sentences	No. of words
	Small	2,596	232	14,736	166,961	934,723
	Medium	1,419	1,242	61,959	633,521	3,382,126
	Large	822	5,700	696,691	9,267,658	52,041,718
	Total	4,837	7,174	773,386	10,068,140	56,358,567

Panel B: News Articles Associated with Recommendation Revisions

		No. of firms subject to revision	No. of events	No. of articles within 10 days prior to the events.	No. of positive words prior to the events.	No. of negative words prior to the events.
Downgrades	Small	81	158	929	238	339
	Medium	297	711	1,234	656	620
	Large	510	2,869	37,005	42,590	47,471
	Sub-total	888	3,738	39,168	43,484	48,430
Upgrades	Small	43	74	392	67	87
	Medium	245	531	1,141	517	447
	Large	505	2,831	35,643	41,547	44,615
	Sub-total	793	3,436	37,176	42,131	45,149
	Total	1,681	7,174	76,344	85,615	93,579

Panel C: Media Coverage and Sentiment

		No. of media covered event	No. of no-media covered event	No. of events with positive score	No. of events with neutral score	No. of events with negative score
Downgrades	Small	41	117	14	18	10
	Medium	265	446	89	120	65
	Large	2,486	383	1,082	691	703
	Sub-total	2,792	946	1,185	829	778
Upgrades	Small	19	55	7	6	6
	Medium	167	364	32	98	37
	Large	2,482	349	898	674	910
	Sub-total	2,668	768	937	778	953
	Total	5,460	1,714	2,122	1,607	1,731

Table III Three-day Cumulative Abnormal Return of Stocks Revised by Analysts

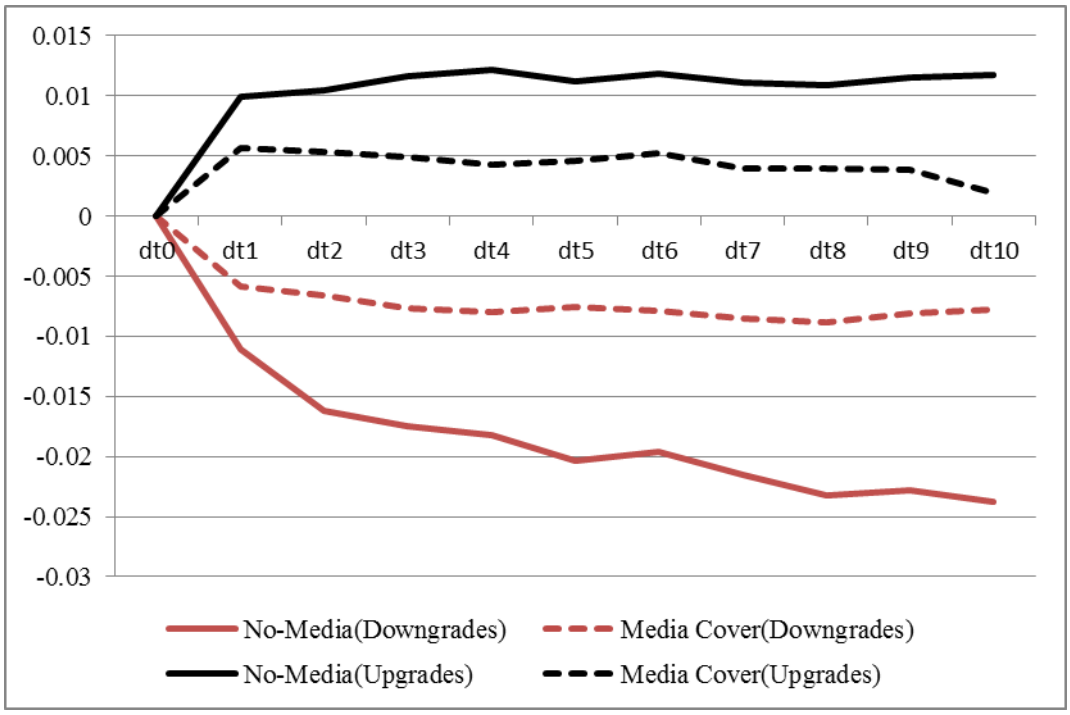
This table presents average three-day cummulative abnormal return for firms that are upgraded and downgraded by analysts. Panel A describes results based on the benchmark return generated using the market model. Panel B shows the result based on the respective control firm. Control firm is chosen using industry, size and book-to-market criteria.

	Total	Strong Outperform	Outferform	Neutral	Underperform	Strong Underperform
Panel A: Market Model						
Upgrade						
n	3,436	357	2,182	885	12	n/a
CAR	0.60%	1.18%	0.81%	-0.19%	3.47%	n/a
p-value	***0.000***	***0.000***	***0.000***	*0.349*	*0.182*	n/a
Downgrade						
n	3738	n/a	393	2524	821	252
CAR	-1.13%	n/a	-0.95%	-1.29%	-0.97%	-0.41%
p-value	***0.000***	n/a	***0.003***	***0.000***	***0.001***	*0.357*
Panel B: Industry, Size and Book-to-Market Adjusted Control Firm						
Upgrade						
n	3,436	357	2,182	885	12	n/a
CAR	0.67%	1.28%	0.94%	-0.26%	2.19%	n/a
p-value	***0.000***	***0.001***	***0.000***	*0.157*	*0.124*	n/a
Downgrade						
n	3,738	n/a	393	2,524	821	252
CAR	-0.98%	n/a	-1.01%	-1.03%	-0.74%	-1.06%
p-value	***0.000***	n/a	***0.001***	***0.000***	***0.000***	***0.001***

Table IV: Pre-recommendation sentiment in news articles. Examples of a Typical Case.
This table indicates the prior ten day news appearance of four of our sample firms. The sentiment score of each day is the total number of positive word minus the negative word appearance of the day. We picked three typical news for each stock of our choice.

	CAR	Total	t-10	t-9	t-8	t-7	t-6	t-5	t-4	t-3	t-2	t-1
Mitsubishi Corporation upgraded on Jan 18 2012	5.03%		2012/1/8	1/9	1/10	1/11	1/12	1/13	1/14	1/15	1/16	1/17
Sentiment Score		6	0	2	0	1	0	2	3	0	-2	0
# of Articles		15	0	1	0	4	3	1	1	1	4	0
Contents summary example		*Government announced domestic ariport to be privatized. Mitsubisi Corp. has experience in it.(t-9) *34bil dollar LNG project to start in Australia in 13th Jan. Mistubishi Corp has stake in it. (t-5) *Mitsubishi corp and Hokuetsu paper jointly open a state of the art plant to burn LNG (t-2)										
Mitsubishi Material Co. Ltd upgraded on May 29 2009	7.99%		2009/5/19	5/20	5/21	5/22	5/23	5/24	5/25	5/26	5/27	5/28
Sentiment Score		4	0	0	-2	5	0	0	0	0	0	1
# of Articles		13	0	0	1	7	0	0	0	0	1	4
Contents summary example		*Mitsubishi Material to produce copper production with full capacity from August due to Auto demand (t-7) *Lower coal price led five cement companies to have higher profit in the 2nd Q. (t-2) *Non-ferrous metals industry is one of the best performers today. (t-1)										
Sharp Corporation downgrade on Aug. 3 2012	-2.32%		2012/7/25	7/25	7/26	7/27	7/28	7/29	7/30	7/31	8/1	8/2
Sentiment Score		-12	0	-8	0	-3	0	1	-2	1	-2	1
# of Articles		29	0	4	2	4	0	1	6	1	2	9
Contents summary example		*All electrocnic appliance companies are under pressure. Sharp made a new low. (t-9) *Sharp developed smaller and lighter LCD panel for e-book. It is going to be in the market from Aug. (t-5) *Sharp downward revised the earnings prospect. Also announced restructuring 5000 workforce (t-1)										
Ricoh Co Ltd downgraded on April 27 2012	-11.26%		2012/4/17	4/18	4/19	4/20	4/21	4/22	4/23	4/24	4/25	4/26
Sentiment Score		-11	0	0	0	-1	0	0	0	-3	-3	-4
# of Articles		-11	0	0	0	2	0	0	0	1	4	3
Contents summary example		*Nomura and its affiliated investor reduce their Ricoh's share holdings below 5% (t-7) *Selling pressure mounts to stocks that have high exposure to European economy including Ricoh. (t-4) *Ricoh's earnings plunge to net loss, first time in its company history. 10,000 job cuts to follow.(t-1)										

Figure 1: Post-Announcement performance by Media Coverage



Plot of cumulative abnormal return for the period of 10 business days after the announcement using the industry, size and book-to-market based control firm. Cumulative return is calculated from the opening price of the following business day post recommendation announcement (dt 0). The dotted line indicates CAR of stocks that are covered by the media; the solid line no media-covered. Among 6,038 upgraded stocks, 3,212 are media-covered and 2,668 no-media covered. The total of 6,110 stocks are downgraded with 2,969 media-covered and 3,141 no-media covered.

Figure 2: Post-Announcement Performance by Sentiment Score

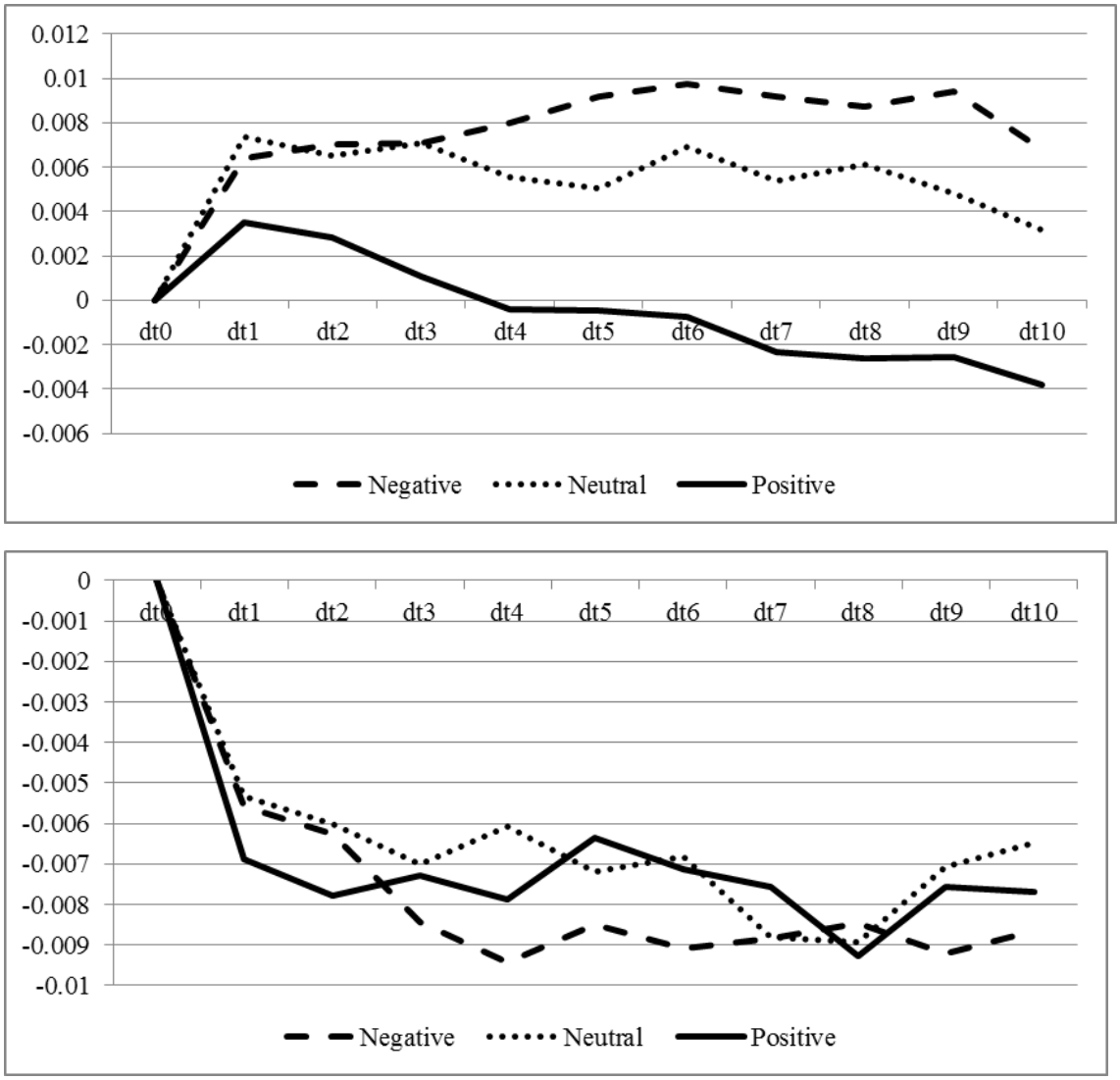


Table V: Summary of Post-Annoucement CAR for Total Sample and Clean Sample

	Upgarade																	
	Media Cover	No Media Cover	*p-value*	Media Cover	No Media Cover	*p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*
	Total Sample (n=3,436)			Clean Sample (n=2,415)			Total Sample (n=2,668)						Clean Sample (n=1,847)					
n	2,668	768		1,847	568		857	987	824				560	720	567			
CAR1	0.57%	0.99%	**0.011**	0.48%	1.00%	**0.037**	0.55%	0.81%	0.29%	**0.000**	**0.000**	**0.005**	0.57%	0.82%	0.30%	**0.001**	**0.000**	**0.014**
CAR2	0.54%	1.04%	**0.024**	0.56%	1.13%	0.074	0.63%	0.81%	0.12%	**0.000**	**0.000**	0.412	0.75%	0.96%	0.05%	**0.001**	**0.000**	0.756
CAR3	0.49%	1.16%	**0.010**	0.55%	1.25%	**0.047**	0.69%	0.77%	-0.04%	**0.001**	**0.000**	0.816	0.76%	0.96%	-0.18%	**0.004**	**0.000**	0.369
CAR4	0.43%	1.22%	**0.009**	0.60%	1.44%	**0.047**	0.72%	0.67%	-0.17%	**0.003**	**0.001**	0.348	0.85%	0.91%	-0.22%	**0.006**	**0.000**	0.317
CAR5	0.46%	1.12%	0.053	0.73%	1.25%	0.183	0.83%	0.67%	-0.19%	**0.003**	**0.003**	0.347	1.05%	0.76%	-0.20%	**0.004**	**0.005**	0.414
CAR6	0.52%	1.19%	0.070	0.74%	1.41%	0.351	0.93%	0.70%	-0.12%	**0.003**	**0.003**	0.573	1.13%	0.83%	-0.09%	**0.006**	**0.003**	0.740
CAR7	0.40%	1.11%	0.069	0.69%	1.27%	0.490	0.95%	0.40%	-0.19%	**0.003**	0.109	0.409	1.21%	0.66%	-0.15%	**0.004**	**0.023**	0.594
CAR8	0.39%	1.09%	0.098	0.73%	1.51%	0.340	0.95%	0.52%	-0.33%	**0.004**	0.053	0.182	1.20%	0.81%	-0.30%	**0.005**	**0.008**	0.327
CAR9	0.38%	1.15%	0.076	0.65%	1.63%	0.209	1.05%	0.37%	-0.30%	**0.003**	0.189	0.237	1.34%	0.65%	-0.28%	**0.004**	**0.044**	0.361
CAR10	0.20%	1.18%	**0.026**	0.44%	1.78%	0.086	0.69%	0.27%	-0.41%	0.078	0.339	0.132	0.92%	0.60%	-0.35%	0.083	0.073	0.283
	Downgrades																	
	Media Cover	No Media Cover	*p-value*	Media Cover	No Media Cover	*p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*
	Total Sample (n=3,738)			Clean Sample (n=2,560)			Total Sample (n=2,792)						Clean Sample (n=1,928)					
n	2,792	946		1,928	632		978	1,105	709				625	792	511			
CAR1	-0.59%	-1.11%	**0.001**	-0.45%	-1.30%	**0.000**	-0.58%	-0.55%	-0.65%	**0.000**	**0.000**	**0.000**	-0.56%	-0.53%	-0.69%	**0.004**	**0.000**	**0.000**
CAR2	-0.66%	-1.62%	**0.000**	-0.61%	-1.94%	**0.000**	-0.64%	-0.54%	-0.87%	**0.000**	**0.000**	**0.000**	-0.63%	-0.60%	-0.78%	**0.010**	**0.013**	**0.000**
CAR3	-0.77%	-1.74%	**0.000**	-0.78%	-2.23%	**0.001**	-0.81%	-0.61%	-0.95%	**0.001**	**0.000**	**0.000**	-0.84%	-0.70%	-0.73%	**0.010**	**0.018**	**0.000**
CAR4	-0.80%	-1.82%	**0.001**	-0.74%	-2.36%	**0.006**	-0.93%	-0.60%	-0.92%	**0.001**	**0.002**	**0.000**	-0.94%	-0.61%	-0.79%	**0.008**	**0.043**	**0.000**
CAR5	-0.75%	-2.04%	**0.000**	-0.65%	-2.57%	**0.001**	-0.80%	-0.73%	-0.72%	**0.006**	**0.001**	**0.003**	-0.85%	-0.72%	-0.64%	**0.024**	**0.024**	**0.009**
CAR6	-0.79%	-1.96%	**0.001**	-0.58%	-2.45%	**0.008**	-0.92%	-0.68%	-0.77%	**0.003**	**0.004**	**0.003**	-0.91%	-0.68%	-0.71%	**0.029**	**0.027**	**0.010**
CAR7	-0.85%	-2.16%	**0.001**	-0.73%	-2.57%	**0.005**	-1.09%	-0.63%	-0.85%	**0.002**	**0.013**	**0.002**	-0.88%	-0.88%	-0.76%	**0.015**	0.077	**0.017**
CAR8	-0.88%	-2.33%	**0.001**	-0.65%	-2.75%	**0.004**	-1.01%	-0.70%	-1.00%	**0.005**	**0.009**	**0.001**	-0.85%	-0.89%	-0.93%	**0.036**	0.062	**0.011**
CAR9	-0.81%	-2.28%	**0.001**	-0.50%	-2.96%	**0.002**	-1.10%	-0.60%	-0.73%	**0.003**	**0.026**	**0.024**	-0.92%	-0.71%	-0.76%	**0.045**	0.140	0.144
CAR10	-0.77%	-2.37%	**0.000**	-0.45%	-2.77%	**0.001**	-1.16%	-0.48%	-0.69%	**0.003**	0.085	**0.034**	-0.87%	-0.65%	-0.77%	**0.046**	0.242	0.202

Table VI: Summary of Pre-Annoucement CAR for Total Sample and Clean Sample

	Upgarade																	
	Media Cover	No Media Cover	*p-value*	Media Cover	No Media Cover	*p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*
	Total Sample (n=3,436)			Clean Sample (n=2,415)			Total Sample (n=2,668)						Clean Sample (n=1,847)					
n	2,668	768		1,847	568		857	987	824				560	720	567			
CAR-10	0.06%	-0.07%	0.328	0.14%	-0.09%	0.174	-0.01%	0.19%	0.03%	0.937	0.303	0.340	0.08%	0.18%	0.13%	0.558	0.083	0.279
CAR-9	0.12%	-0.27%	0.075	0.27%	-0.26%	**0.035**	-0.10%	0.27%	0.20%	0.895	0.301	0.251	0.10%	0.36%	0.33%	0.604	**0.019**	0.078
CAR-8	0.10%	-0.39%	0.059	0.21%	-0.49%	**0.026**	-0.26%	0.24%	0.35%	0.685	0.880	**0.025**	-0.04%	0.26%	0.38%	0.883	0.159	0.069
CAR-7	0.08%	-0.53%	**0.045**	0.28%	-0.65%	**0.012**	-0.44%	0.21%	0.50%	0.364	0.726	**0.045**	-0.10%	0.35%	0.56%	0.733	0.094	**0.022**
CAR-6	0.10%	-0.52%	0.066	0.33%	-0.69%	**0.012**	-0.36%	0.03%	0.62%	0.509	0.867	**0.040**	0.00%	0.35%	0.62%	0.994	0.138	**0.026**
CAR-5	-0.03%	-0.55%	0.167	0.17%	-0.64%	0.073	-0.81%	-0.04%	0.75%	0.069	0.406	**0.007**	-0.29%	0.12%	0.68%	0.400	0.641	**0.028**
CAR-4	-0.01%	-0.44%	0.277	0.15%	-0.58%	0.125	-0.90%	0.03%	0.84%	**0.036**	0.685	**0.004**	-0.57%	0.14%	0.86%	0.153	0.632	**0.011**
CAR-3	0.05%	-0.52%	0.187	0.13%	-0.54%	0.187	-1.03%	0.12%	1.05%	**0.025**	0.969	**0.001**	-0.87%	0.21%	1.00%	**0.042**	0.491	**0.004**
CAR-2	0.36%	-0.14%	0.292	0.37%	-0.19%	0.305	-0.75%	0.30%	1.49%	0.211	0.399	**0.000**	-0.71%	0.39%	1.43%	0.134	0.038	**0.000**
CAR-1	0.80%	0.43%	0.425	0.74%	0.36%	0.497	-0.52%	0.70%	2.18%	0.655	0.055	**0.000**	-0.47%	0.69%	2.00%	0.353	0.558	**0.000**
	Downgrades																	
	Media Cover	No Media Cover	*p-value*	Media Cover	No Media Cover	*p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*
	Total Sample (n=3,738)			Clean Sample (n=2,560)			Total Sample (n=2,792)						Clean Sample (n=1,928)					
n	2,792	946		1,928	632		978	1,105	709				625	792	511			
CAR-10	-0.13%	-0.02%	0.421	-0.18%	0.11%	0.082	-0.12%	-0.09%	-0.18%	0.519	0.023	0.538	-0.35%	-0.18%	0.01%	**0.029**	0.098	0.957
CAR-9	-0.22%	0.02%	0.211	-0.26%	0.13%	0.103	-0.44%	-0.10%	-0.03%	**0.020**	0.129	0.766	-0.58%	-0.19%	0.01%	**0.005**	0.206	0.944
CAR-8	-0.27%	0.03%	0.223	-0.23%	0.05%	0.348	-0.71%	-0.05%	0.18%	**0.000**	0.635	0.603	-0.88%	0.05%	0.12%	**0.000**	0.763	0.640
CAR-7	-0.32%	-0.02%	0.290	-0.21%	0.04%	0.467	-1.01%	-0.09%	0.47%	**0.000**	0.427	0.173	-1.10%	0.06%	0.48%	**0.000**	0.800	0.081
CAR-6	-0.36%	0.04%	0.196	-0.18%	0.07%	0.488	-1.20%	-0.21%	0.75%	**0.000**	0.461	0.068	-1.27%	0.11%	0.70%	**0.000**	0.673	**0.027**
CAR-5	-0.37%	0.34%	**0.038**	-0.16%	0.34%	0.213	-1.31%	-0.28%	0.95%	**0.000**	0.327	**0.020**	-1.36%	0.09%	0.93%	**0.000**	0.747	**0.008**
CAR-4	-0.47%	0.26%	0.058	-0.25%	0.36%	0.163	-1.54%	-0.41%	1.10%	**0.000**	0.119	**0.007**	-1.57%	-0.07%	1.10%	**0.000**	0.801	**0.004**
CAR-3	-0.46%	-0.21%	0.536	-0.19%	-0.02%	0.706	-1.65%	-0.41%	1.29%	**0.000**	0.308	**0.008**	-1.78%	0.12%	1.27%	**0.000**	0.705	**0.002**
CAR-2	-0.49%	-0.47%	0.962	-0.30%	-0.30%	0.999	-1.84%	-0.54%	1.59%	**0.000**	0.188	**0.003**	-2.01%	-0.12%	1.50%	**0.000**	0.722	**0.001**
CAR-1	-0.98%	-0.95%	0.955	-0.69%	-0.79%	0.847	-2.93%	-0.54%	1.53%	**0.000**	**0.027**	**0.009**	-2.74%	-0.35%	1.31%	**0.000**	0.315	**0.005**

The Streaming News Effect on Investor Behavior surrounding Analyst Stock Revision Announcement

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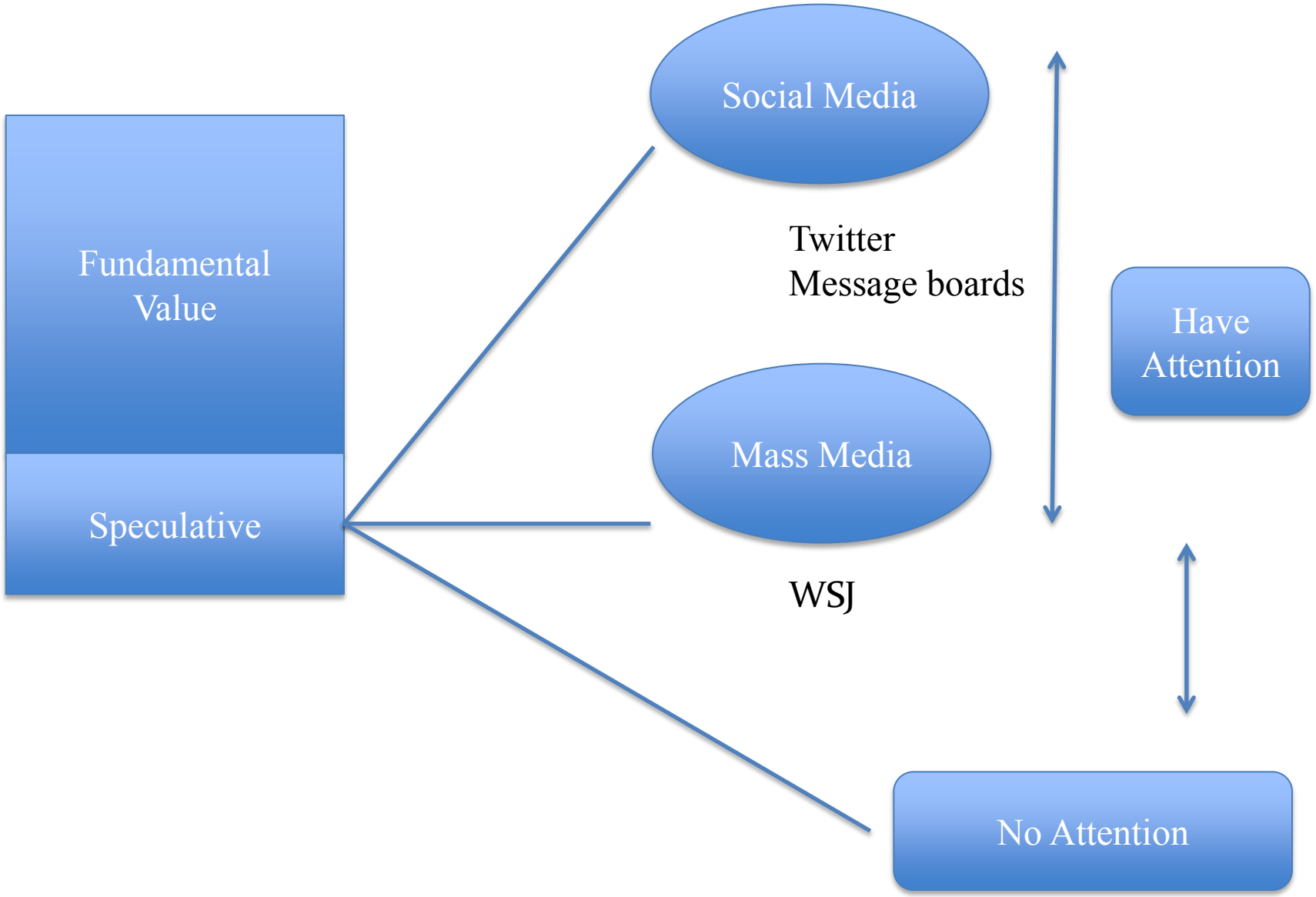
Prior studies of media effect on stock market

1. Antweiler and Frank (2004) JF; Naïve investors messages are predictor of volatility
2. Li (2006) WP: "Risk" "Uncertain" in annual report will predict lower return in the year ahead.
3. Tetlock (2007) JF; Negative words in the "Abreast of the Market" in WSJ predict returns in DJ index
4. Tetlock (2008) JF; Sentiment in News have some fundamental information
5. Tetlock (2010) Wp; Investors are reacting to stale information
6. Bollen et al. (2010) JCS; Twitter mood predicts stock return
7. Fand and Peress (2009) JF; Stocks that are not covered by the media must have higher risk premium because investors only diversify among firms they know.
8. Chan (2003)JFE; There is a return continuation with news, return reversal without news


Fundamental Value
Speculative
Social Media
Twitter
Message boards
Mass Media
WSJ
Have Attention
No Attention

Purpose of this paper

We investigate the stock market performance in relation to the event. Specifically, we look into stocks that are revised by the sell-side analysts.

- Investigate whether there is any difference in post-announcement return between stocks that are covered by the media and otherwise.
- Investigate whether there is any difference in post-announcement return among stocks that are reported in the media with positivity and negativity.

Hypotheses and expected price reaction

1. Attention grabbing stocks are overvalued because naïve investors would be buying while pros are selling. (Barber and Odean (2008)). Post-event performance after the securities analysts' revision would be meager when there are no news before the event.

2. For Bayesian updating investors, arrival of good (or bad) fundamental news is a surprise if there is no expectation formed about the stock.

3. Fang and Peress (2009) demonstrate 'no-media premium' in the long run. Therefore, it should be observed in the short run.

4. If a fraction of the fundamental information is conveyed in the stock market as suggested by Tetlock et al.(2008), we should observe less acute response of those covered by the media.

Sample firms

Table I Descriptive Statistics on Analysts' Recommendation Revisions between Jan. 1st 2008 to Dec. 31st 2012.

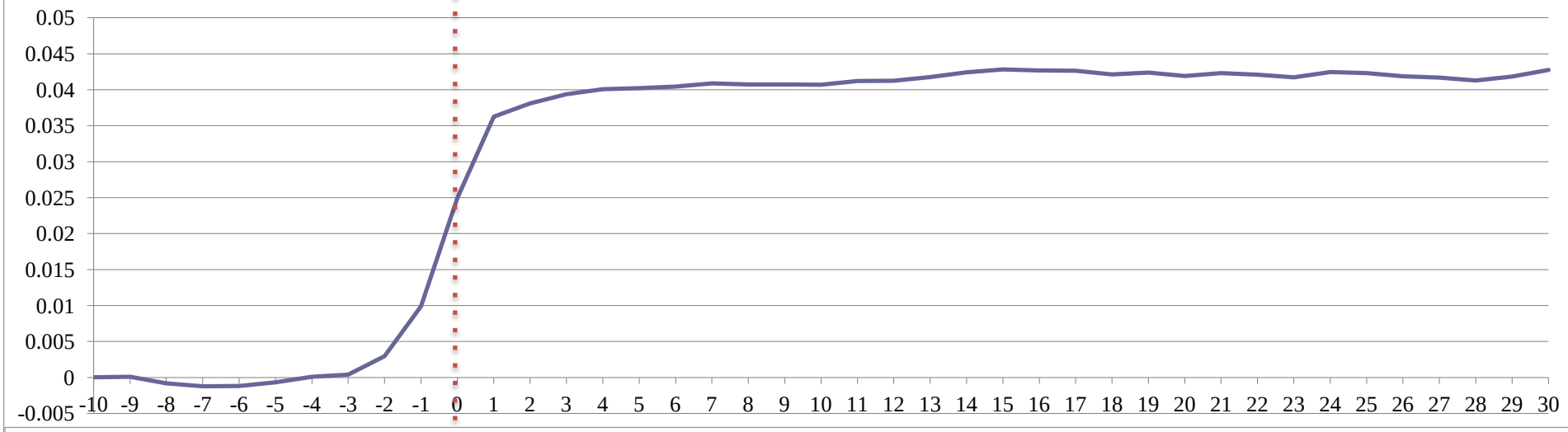
This table shows the number of rating revision events occurred during our sample period by year. Large firms tend to be revised more than once during the calendar year. Event total indicates the number of revision events during the calendar year including firms that are subject to revision for more than once.

Year	Market	No. of Listed Firms	No. of Covered Firms	Covererage ratio	No. of Firms that are revised more than once	Upward revision	Downward revision	Total
2008	TSE	2,170	973	45%	434	780	1,119	2,097
	JASDAQ	915	147	16%	49	77	121	
2009	TSE	2,282	999	44%	373	835	678	1,586
	JASDAQ	882	149	17%	18	32	41	
2010	TSE	2,691	1,484	55%	289	652	500	1,203
	JASDAQ	996	597	60%	11	22	29	
2011	TSE	2,083	1,514	73%	284	521	543	1,114
	JASDAQ	961	688	72%	11	20	30	
2012	TSE	2,094	1,458	70%	273	479	651	1,174
	JASDAQ	919	595	65%	7	18	26	
Total					1,749	**3,436**	**3,738**	7,174

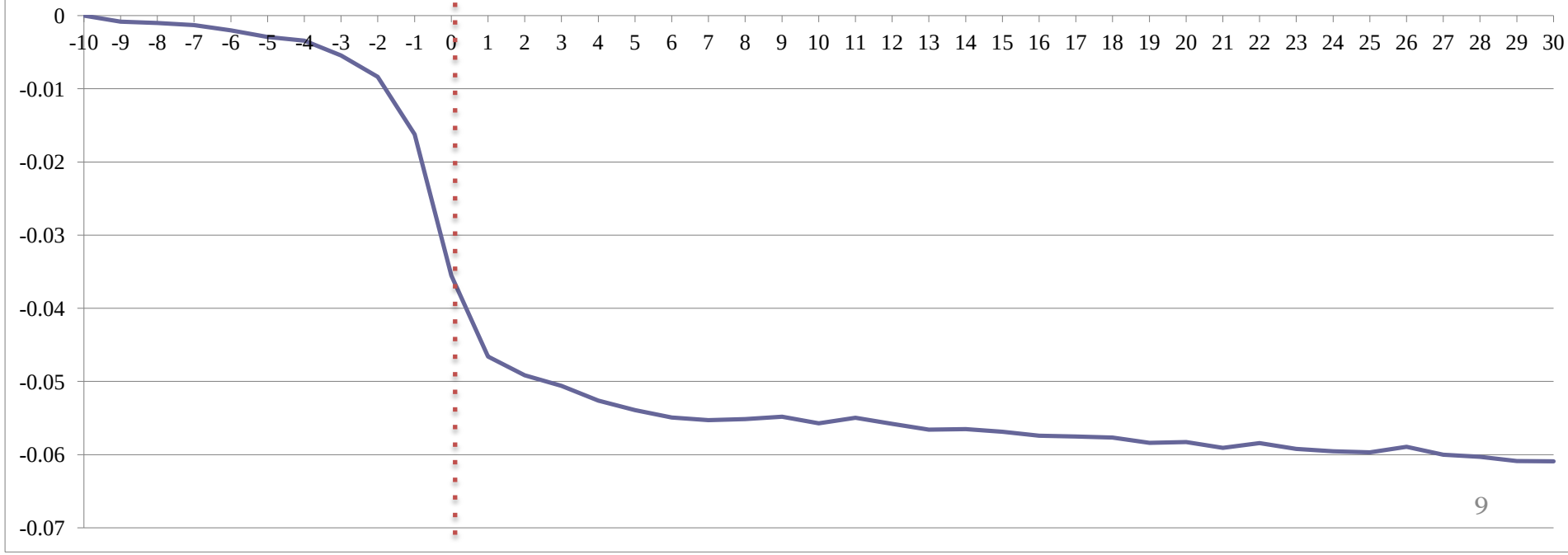
Findings 1

Excess return on upgrades

(bench mark: Industry size and book to market based control firm)



Excess return on downgrades



I. Market responds to the direction of the rating revisions. Not the absolute level of the analysts ratings.

II. Market responds a few days prior to the announcement presumably because

- Brokers allow their clients to access to the rating revision before the official announcement

- Analysts are tipping

- Some portion of the fundamental news is leaking in media as suggested by Tetlock et.al (2008)

Sample firms and news

Table II Summary Statistics of Our Sample Firms, News Articles and the Sentiment

Panel A indicates the total number of events and articles covered. Panel B shows the description of news articles associated with the recommendation revisions. Panel C describes the distribution of firms covered by the media with its sentiment.

Panel A: News Articles with a Company Name

	No. of stocks	No.of events	No. of articles	No. of sentences	No. of words
Small	2,596	232	14,736	166,961	934,723
Medium	1,419	1,242	61,959	633,521	3,382,126
Large	822	5,700	696,691	9,267,658	52,041,718
Total	4,837	7,174	773,386	10,068,140	56,358,567

Panel B: News Articles Associated with Recommendation Revisions

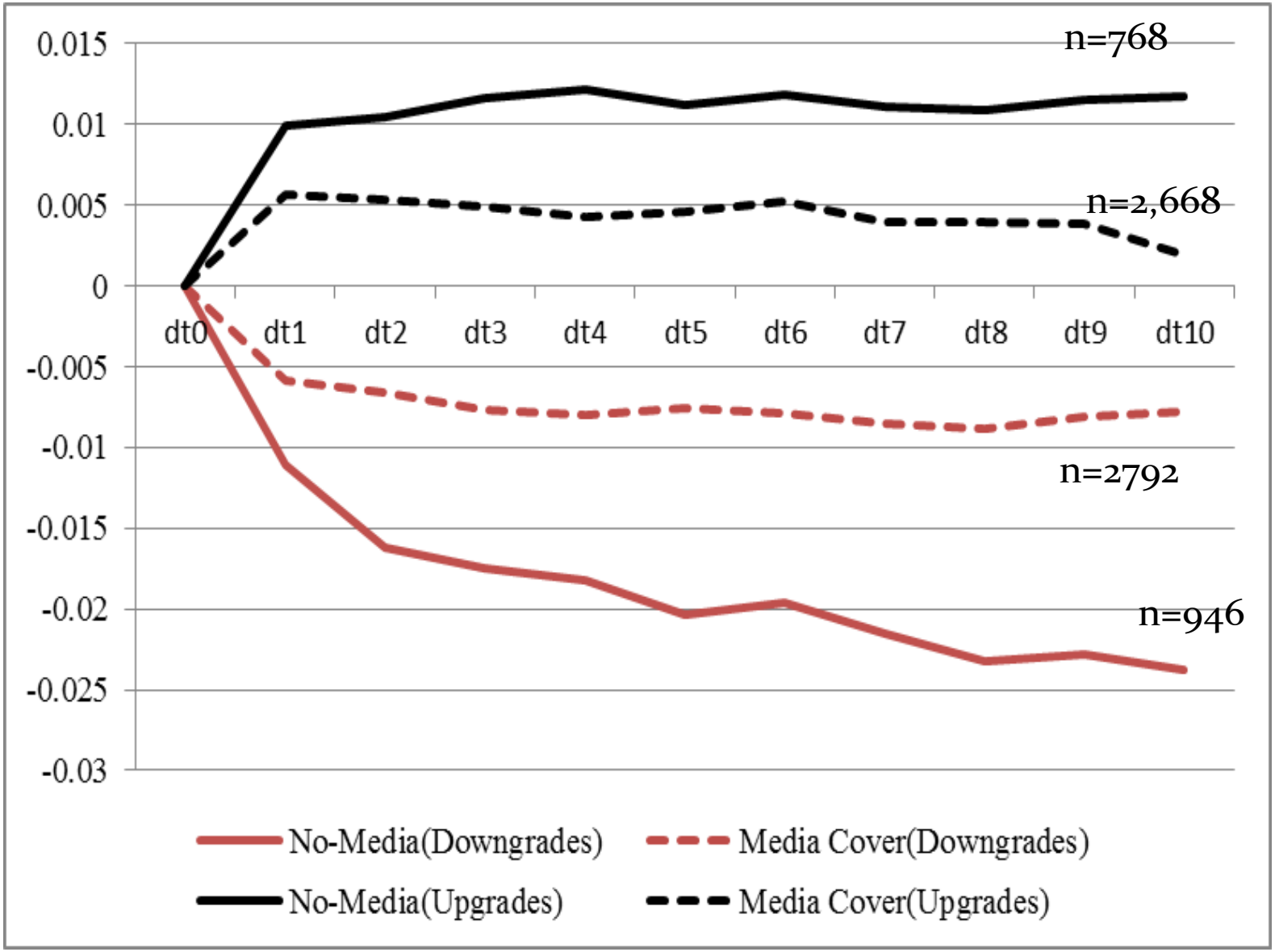
		No. of firms subject to revision	No. of events	No. of articles within 10 days prior to the events.	No. of positive words prior to the events.	No. of negative words prior to the events.
Downgrades	Small	81	158	929	238	339
	Medium	297	711	1,234	656	620
	Large	510	2,869	37,005	42,590	47,471
	Sub-total	888	**3,738**	39,168	43,484	48,430
Upgrades	Small	43	74	392	67	87
	Medium	245	531	1,141	517	447
	Large	505	2,831	35,643	41,547	44,615
	Sub-total	793	**3,436**	37,176	42,131	45,149
	Total	1,681	7,174	76,344	85,615	93,579

Panel C: Media Coverage and Sentiment

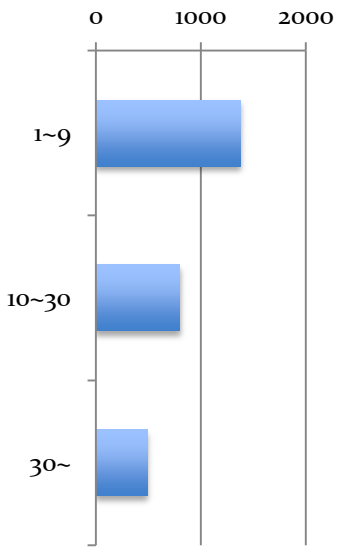
		No. of media covered event	No. of no-media covered event	No. of events with positive score	No. of events with neutral score	No. of events with negative score
Downgrades	Small	41	117	14	18	10
	Medium	265	446	89	120	65
	Large	2,486	383	1,082	691	703
	Sub-total	2,792	946	1,185	829	778
Upgrades	Small	19	55	7	6	6
	Medium	167	364	32	98	37
	Large	2,482	349	898	674	910
	Sub-total	2,668	768	937	778	953
	Total	5,460	1,714	2,122	1,607	1,731

Findings 2

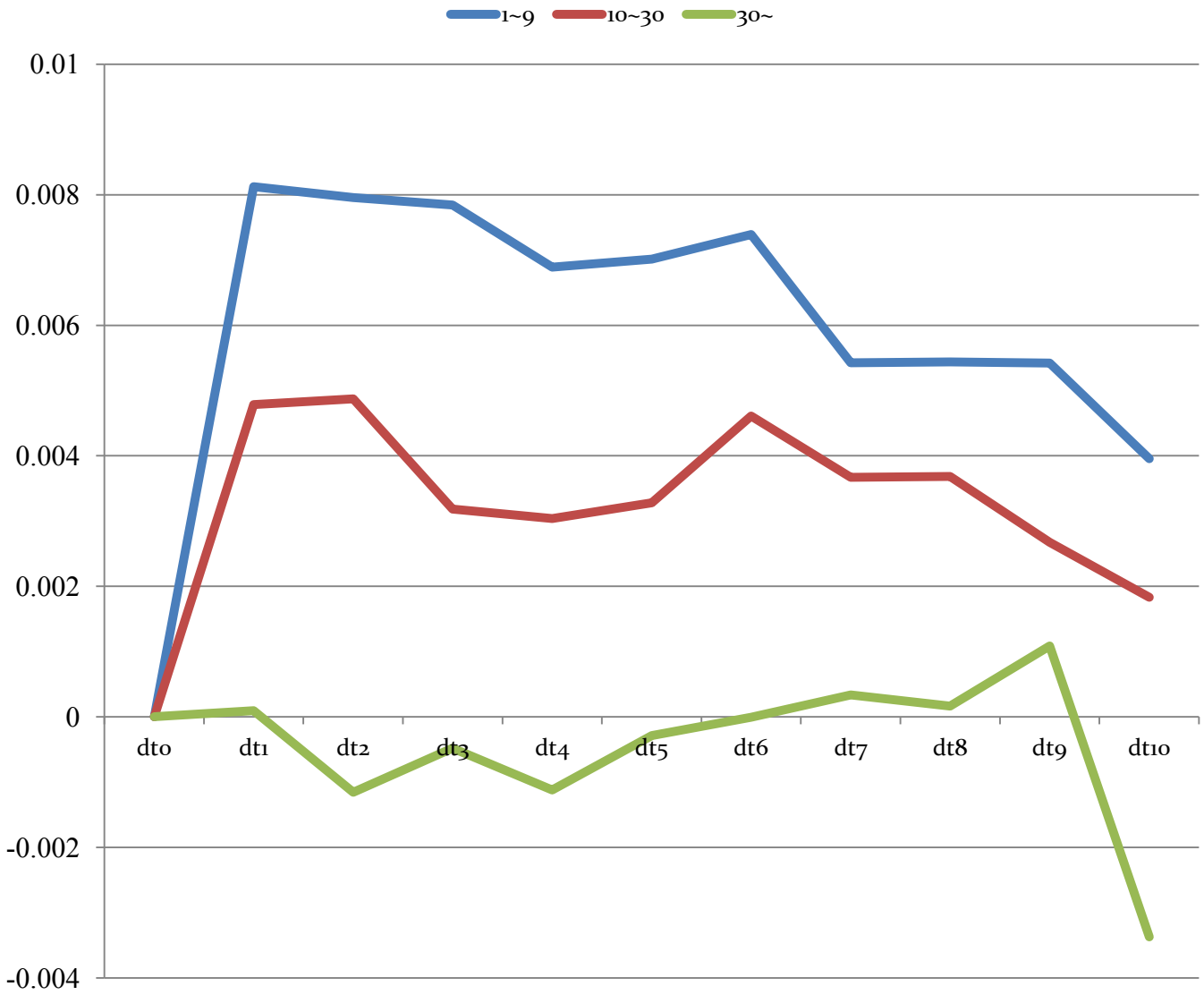
Media covered performance is surely worse than non-media covered counterpart.



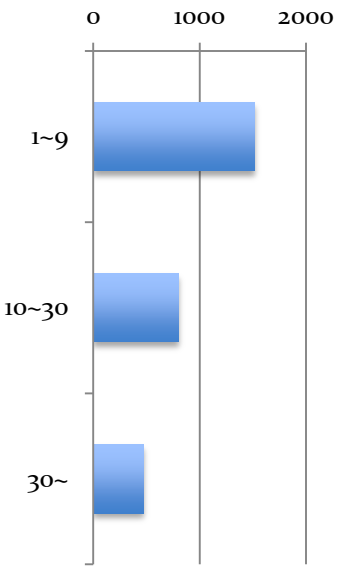
Number of articles



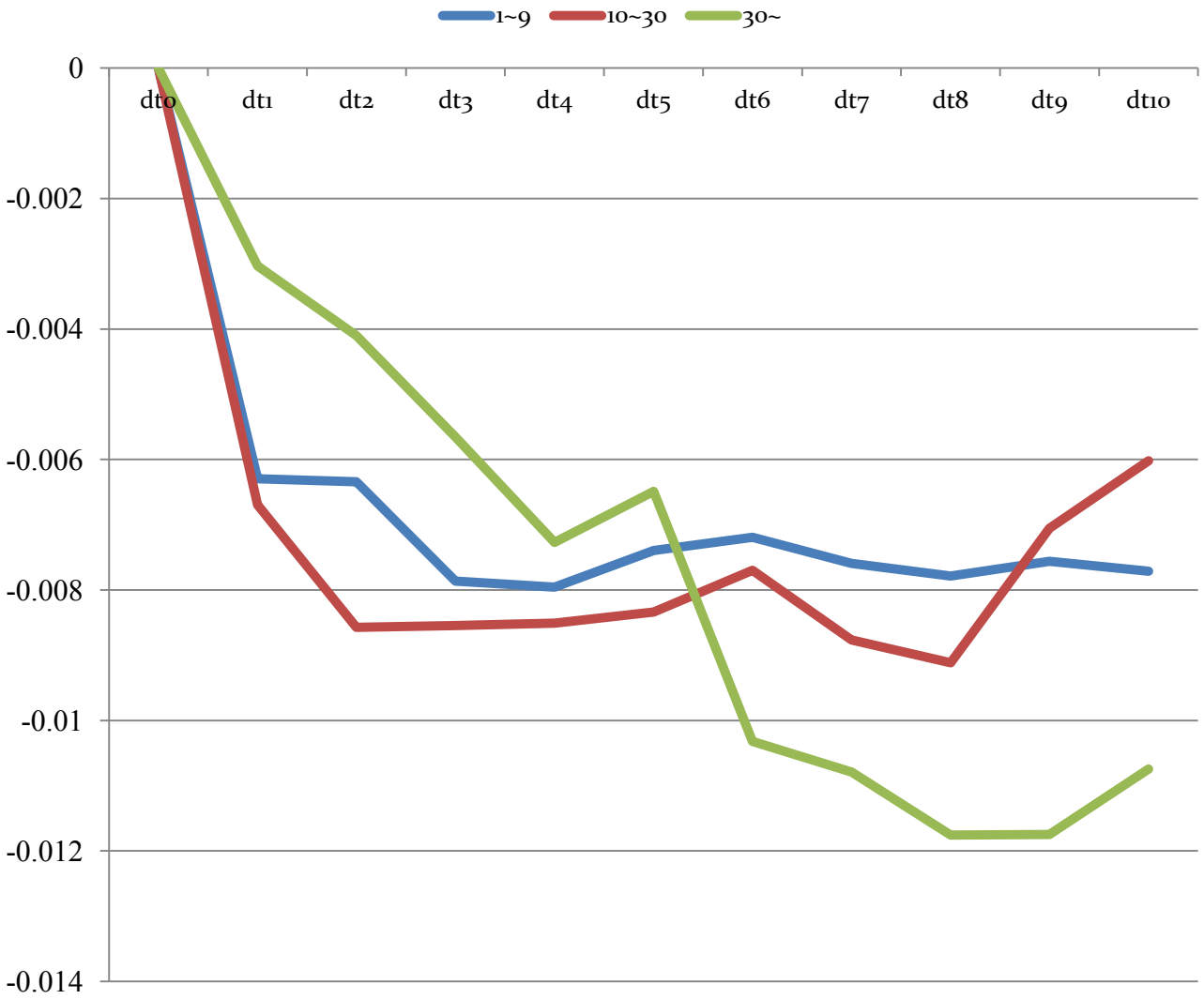
Coverage Frequency and CAR for Upgrades



Number of Articles

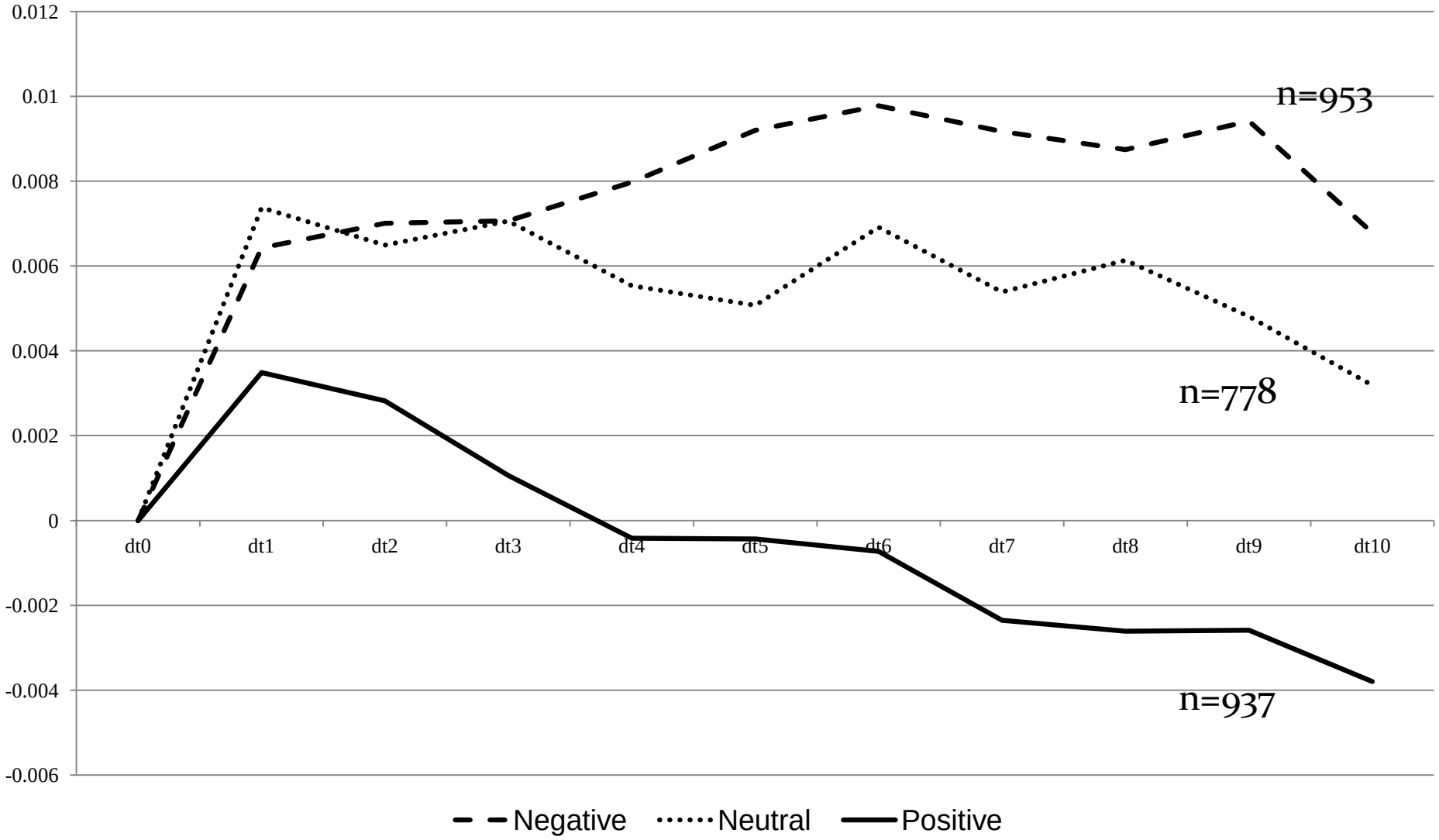


Coverage Frequency and CAR for Downgrades

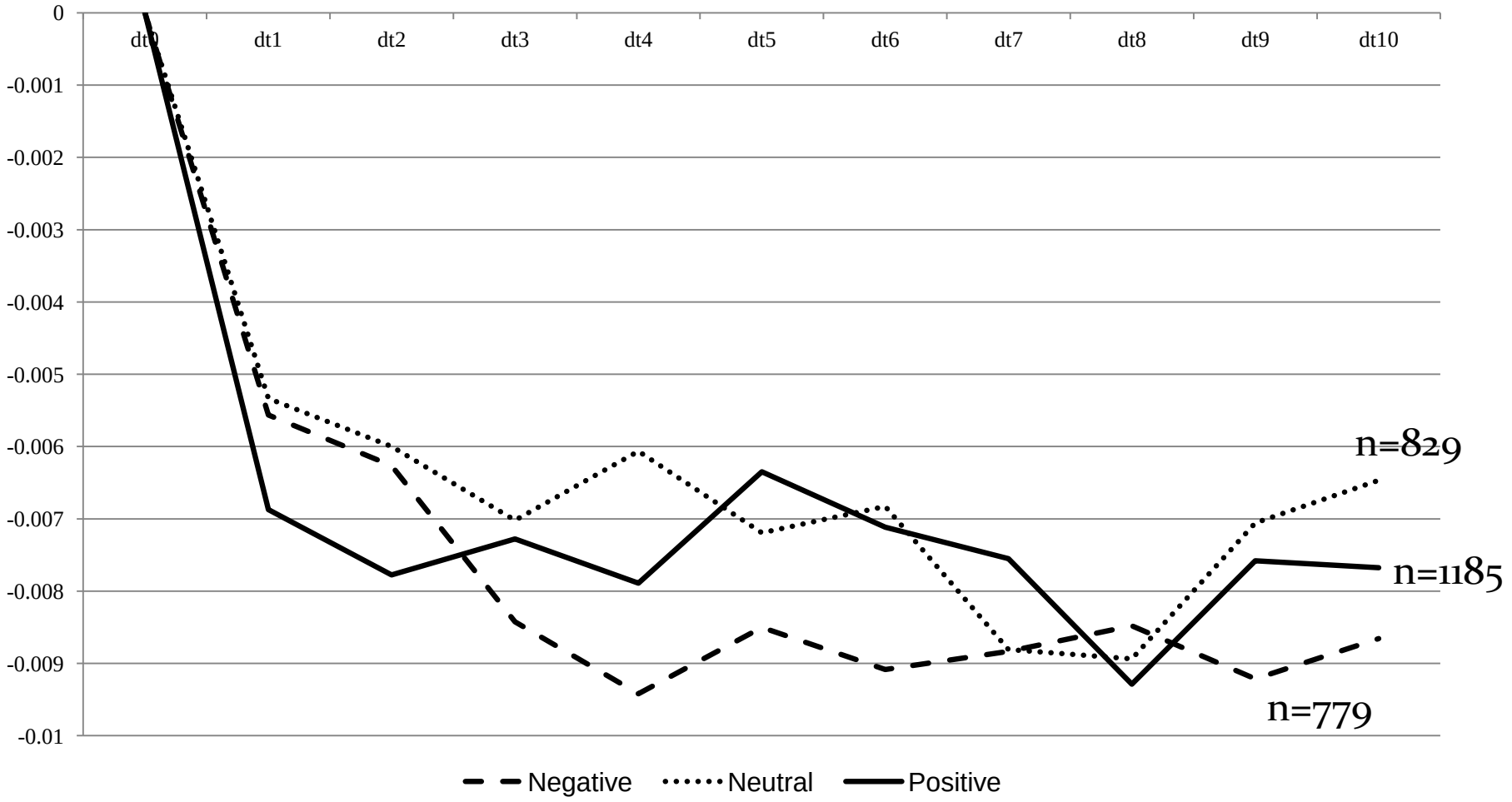


Findings 3

Post-announcement performance classified using the pre-announcement sentiment (media-covered upgraded samples)



Post-announcement performance classified using the pre-announcement sentiment (media-covered downgraded samples)



Robustness Check

Table V: Summary of Post-Annoucement CAR for Total Sample and Clean Sample

	Upgarade																	
	Media Cover	No Media Cover	*p-value*	Media Cover	No Media Cover	*p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*
	Total Sample (n=3,436)			Clean Sample (n=2,415)			Total Sample (n=2,668)						Clean Sample (n=1,847)					
n	2,668	768		1,847	568		857	987	824				560	720	567			
CAR1	0.57%	0.99%	**0.011**	0.48%	1.00%	**0.037**	0.55%	0.81%	0.29%	**0.000**	**0.000**	**0.005**	0.57%	0.82%	0.30%	**0.001**	**0.000**	**0.014**
CAR2	0.54%	1.04%	**0.024**	0.56%	1.13%	0.074	0.63%	0.81%	0.12%	**0.000**	**0.000**	0.412	0.75%	0.96%	0.05%	**0.001**	**0.000**	0.756
CAR3	0.49%	1.16%	**0.010**	0.55%	1.25%	**0.047**	0.69%	0.77%	-0.04%	**0.001**	**0.000**	0.816	0.76%	0.96%	-0.18%	**0.004**	**0.000**	0.369
CAR4	0.43%	1.22%	**0.009**	0.60%	1.44%	**0.047**	0.72%	0.67%	-0.17%	**0.003**	**0.001**	0.348	0.85%	0.91%	-0.22%	**0.006**	**0.000**	0.317
CAR5	0.46%	1.12%	0.053	0.73%	1.25%	0.183	0.83%	0.67%	-0.19%	**0.003**	**0.003**	0.347	1.05%	0.76%	-0.20%	**0.004**	**0.005**	0.414
CAR6	0.52%	1.19%	0.070	0.74%	1.41%	0.351	0.93%	0.70%	-0.12%	**0.003**	**0.003**	0.573	1.13%	0.83%	-0.09%	**0.006**	**0.003**	0.740
CAR7	0.40%	1.11%	0.069	0.69%	1.27%	0.490	0.95%	0.40%	-0.19%	**0.003**	0.109	0.409	1.21%	0.66%	-0.15%	**0.004**	**0.023**	0.594
CAR8	0.39%	1.09%	0.098	0.73%	1.51%	0.340	0.95%	0.52%	-0.33%	**0.004**	0.053	0.182	1.20%	0.81%	-0.30%	**0.005**	**0.008**	0.327
CAR9	0.38%	1.15%	0.076	0.65%	1.63%	0.209	1.05%	0.37%	-0.30%	**0.003**	0.189	0.237	1.34%	0.65%	-0.28%	**0.004**	**0.044**	0.361
CAR10	0.20%	1.18%	**0.026**	0.44%	1.78%	0.086	0.69%	0.27%	-0.41%	0.078	0.339	0.132	0.92%	0.60%	-0.35%	0.083	0.073	0.283
	Downgrades																	
	Media Cover	No Media Cover	*p-value*	Media Cover	No Media Cover	*p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*	Negative	Neutral	Positive	*Negative p-value*	*Neutral p-value*	*Positive p-value*
	Total Sample (n=3,738)			Clean Sample (n=2,560)			Total Sample (n=2,792)						Clean Sample (n=1,928)					
n	2,792	946		1,928	632		978	1,105	709				625	792	511			
CAR1	-0.59%	-1.11%	**0.001**	-0.45%	-1.30%	**0.000**	-0.58%	-0.55%	-0.65%	**0.000**	**0.000**	**0.000**	-0.56%	-0.53%	-0.69%	**0.004**	**0.000**	**0.000**
CAR2	-0.66%	-1.62%	**0.000**	-0.61%	-1.94%	**0.000**	-0.64%	-0.54%	-0.87%	**0.000**	**0.000**	**0.000**	-0.63%	-0.60%	-0.78%	**0.010**	**0.013**	**0.000**
CAR3	-0.77%	-1.74%	**0.000**	-0.78%	-2.23%	**0.001**	-0.81%	-0.61%	-0.95%	**0.001**	**0.000**	**0.000**	-0.84%	-0.70%	-0.73%	**0.010**	**0.018**	**0.000**
CAR4	-0.80%	-1.82%	**0.001**	-0.74%	-2.36%	**0.006**	-0.93%	-0.60%	-0.92%	**0.001**	**0.002**	**0.000**	-0.94%	-0.61%	-0.79%	**0.008**	**0.043**	**0.000**
CAR5	-0.75%	-2.04%	**0.000**	-0.65%	-2.57%	**0.001**	-0.80%	-0.73%	-0.72%	**0.006**	**0.001**	**0.003**	-0.85%	-0.72%	-0.64%	**0.024**	**0.024**	**0.009**
CAR6	-0.79%	-1.96%	**0.001**	-0.58%	-2.45%	**0.008**	-0.92%	-0.68%	-0.77%	**0.003**	**0.004**	**0.003**	-0.91%	-0.68%	-0.71%	**0.029**	**0.027**	**0.010**
CAR7	-0.85%	-2.16%	**0.001**	-0.73%	-2.57%	**0.005**	-1.09%	-0.63%	-0.85%	**0.002**	**0.013**	**0.002**	-0.88%	-0.88%	-0.76%	**0.015**	0.077	**0.017**
CAR8	-0.88%	-2.33%	**0.001**	-0.65%	-2.75%	**0.004**	-1.01%	-0.70%	-1.00%	**0.005**	**0.009**	**0.001**	-0.85%	-0.89%	-0.93%	**0.036**	0.062	**0.011**
CAR9	-0.81%	-2.28%	**0.001**	-0.50%	-2.96%	**0.002**	-1.10%	-0.60%	-0.73%	**0.003**	**0.026**	**0.024**	-0.92%	-0.71%	-0.76%	**0.045**	0.140	0.144
CAR10	-0.77%	-2.37%	**0.000**	-0.45%	-2.77%	**0.001**	-1.16%	-0.48%	-0.69%	**0.003**	0.085	**0.034**	-0.87%	-0.65%	-0.77%	**0.046**	0.242	0.202

Discussion: "The Streaming News Effect on Investor Behavior surrounding Analyst Stock Revision Announcement"

by Takahiro Azuma, Katsuhiko Okada,Yukinobu Hamuro

Sara Ferreira Filipe

Luxembourg School of Finance

Conference on Japanese Financial Markets - Tokyo, July 3rd

Summary

Motivation

- When analysts change stock ratings, there are post-event abnormal returns that might persist.
- This paper focuses on the effect of event information flows:
  - Looks at news coverage of revised stocks;
  - Considers both the effect of news frequency and media sentiment.

Summary

Motivation

- When analysts change stock ratings, there are post-event abnormal returns that might persist.
- This paper focuses on the effect of event information flows:
  - Looks at news coverage of revised stocks;
  - Considers both the effect of news frequency and media sentiment.

Main Findings

- (High) Media coverage mitigates the post-announcement abnormal returns:
  - The Bayesian updating effect is smaller for media-covered stocks;
  - Attention-grabbing stocks are already overvalued at time of revision.
- For positive sentiment news, the rise upon upgrades is limited. Sentiment effect on downgrades is unclear.

Comments

The information role of stock rating revisions

Methodology

Asymmetric post-announcement performance

Comments (1)

The information role of stock rating revisions

This paper:

- Considers analysts rating revisions as "obvious good/bad *fundamental* information about the stock".
- Investigates how investors react to these *new* fundamentals in conjunction with *prevailing* market news.
- Uses word-count method to proxy for *pre-event* sentiment.

Comments (1)
The information role of stock rating revisions

Potential identification problem

- Measures of abnormal returns around revisions are likely to be confounded with abnormal trading triggered by events and news (Jackson, 2005).
- Analyst revisions are typically information-free and piggyback on news (Altınkılıç and Hansen, 2009).

Comments (1)

The information role of stock rating revisions

Potential identification problem

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- Analyst revisions are typically information-free and piggyback on news (Altınkılıç and Hansen, 2009).

Are bayesian-updating investors less surprised by the new information or is the revision simply information-free?

→Unique dataset to explore the information content of rating revisions.

Comments (1)
The information role of stock rating revisions

The timing of revisions

- Recent literature shows that the majority of the revisions immediately follows a media announcement.
- Consider focusing on a different time-window of news coverage.

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Are analyst revisions influential?

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Are analyst revisions influential?

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News and stock returns

- Independently of rating revisions, look at the predictability of stocks returns by news content (eg Tetlock, 2007; Fang and Peress, 2009).
- Is there evidence of analyst herding? Do we observe more downgrades (upgrades) as pre-returns fall (rise)?

Comments (2)
Methodology

Sentiment score:

- Sentiment is calculated as the simple addition of positive/negative words in a news article about a firm.
- A news article can be counted multiple times, once for each company mentioned. Control for multiple-used articles, eg using a dummy variable in the market model equation.
- Consider the effect of downturns: Garcia (2013) shows that the predictability of stock returns using news' content is concentrated in recessions.

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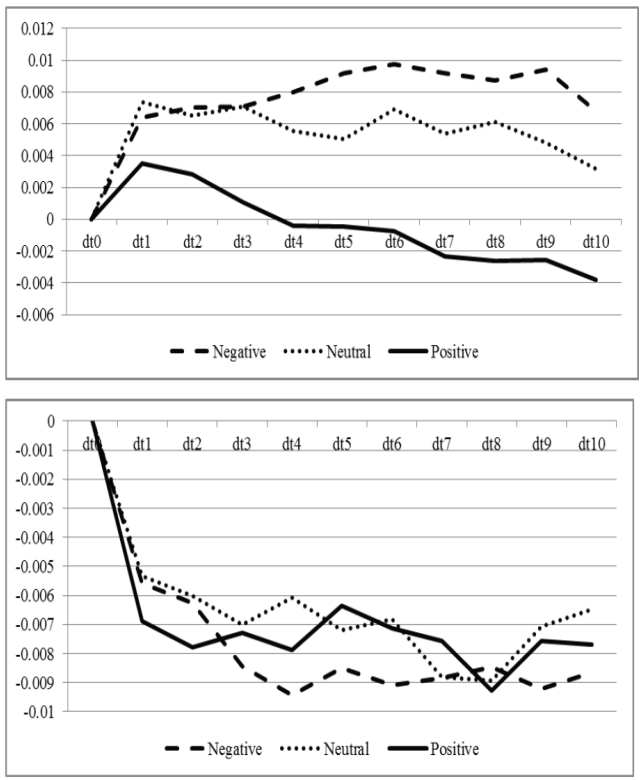
Abnormal returns:

- The return is calculated from opening price of the day following the announcement to the closing price of third day.
- Consider using a narrower return interval as growing evidence shows that stock prices react in minutes to new info (eg Chordia et al, 2008).

Comments (3)

Asymmetric post-announcement performance

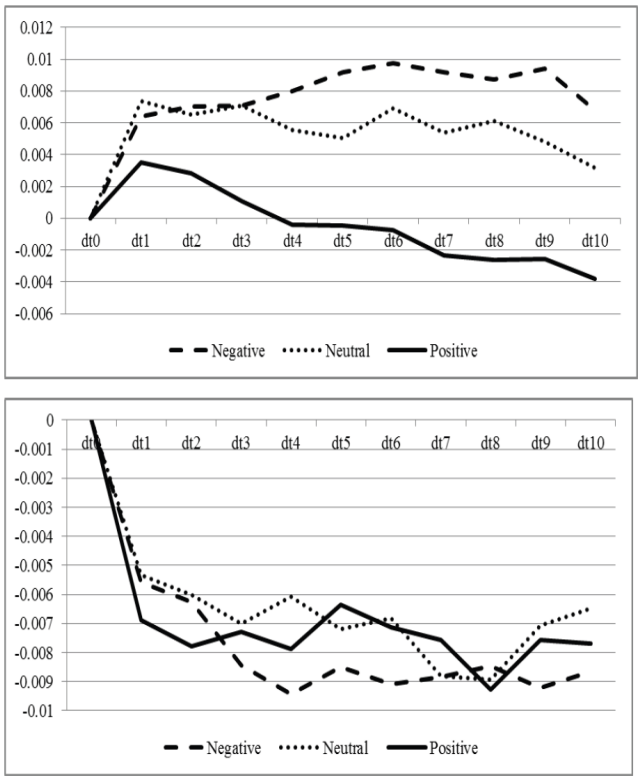
Figure 3: Post-Announcement Performance by Sentiment Score



Comments (3)

Asymmetric post-announcement performance

Figure 3: Post-Announcement Performance by Sentiment Score



After initial reaction, positive sentiment does not lead to positive abnormal returns after upgrades.

Stocks with positive, neutral, negative scores all decline after downgrades.

Consistent with the tendency for management to disperse good news and to harbor bad news? Conrad et al (2006) argue for analyst reluctance to downgrade.

Conclusion

Important and practical issue relating media content and analyst recommendations.

Very rich dataset merging firms' news and financial information around ratings revisions.

Interesting and robust results, with opportunity to better understand the nature of the recommendations.

Good luck with journals!