Market Reaction to Second-Hand News: Attention Grabbing or Information Dissemination?

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Abstract

This paper deals with a long-standing issue in finance: whether the market reaction to second-hand information is caused by price pressure or by information dissemination. We use the perspective of attention grabbing as a particular form of price pressure to analyze the market reaction to the dissemination of analysts' recommendations through the press. This perspective allows the prediction of an asymmetric market reaction to "buy" and "sell" advice, which has previously been detected in a few other empirical studies but is otherwise difficult to rationalize within the standard price pressure hypothesis. We base our empirical analysis on the content of a weekly column of the most important Italian financial newspaper that presents past information and analysts' recommendations on listed companies. Our findings show an asymmetric price and volume reaction. Contrary to previous evidence, we document a positive relationship between the number of analysts quoted in the column and the price (volume) increase associated with positive recommendations. Because the weekly columns simply attract the attention of investors with no additional new information, it is natural to observe a greater reaction for the most "glamorous" stocks (i.e., the stocks most commonly followed by analysts).

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1. Introduction

The financial market efficiency literature has devoted some attention to the stock market reaction to the dissemination of analysts' recommendations through printed media. In an efficient market, the publication of previously issued recommendations should be considered as conveying second-hand information with no consequences for prices and volumes. The empirical evidence from the last thirty years, however, tells a different story: the publication of analysts' recommendations induces abnormal movements in stock prices and trading activity.[1]

This puzzling reaction has generally been explained in two competing ways. According to the so-called *Information Dissemination Hypothesis* (IDH) [Table A.1], prices and volumes adjust because the publication of analysts' recommendations is real news: the trades by analysts' clients would not be sufficient to fully disseminate the information content of these recommendations. In contrast, the *Price Pressure Hypothesis* (PPH) [Table A.2] states that these adjustments are due to the irrational behavior of naïve investors. The key disagreement concerns the empirical evidence supporting the two competing theories with regard to the price reversal in the post-publication period; the price reversal is absent or partial in the IDH but present in the PPH.[2]

The IDH studies are mainly based on two *Wall Street Journal* columns: the daily column "Heard on the Street" ("HS") and the monthly column "Dartboard". In both cases, "buy" and "sell" recommendations are quoted, but the small number of "sell" recommendations allows a separate analysis only for the daily "HS" columns. "Buy" and "sell" recommendations are accompanied, on average, by significant abnormal returns (positive and negative, respectively) on the publication day. These symmetric price movements are in line with rational reactions to good and bad news, respectively. However, there are doubts that the analysts' recommendations discussed in the "HS"

[1] The empirical studies listed in Tables A.1 and A.2 in the appendix analyze printed columns based on analysts' explicit or implicit recommendations. Other studies consider the publication of columnists' recommendations/rumors (Lee, 1986; Ferreira and Smith, 1999; Muradoğlu and Yazici, 2002; Kiymaz, 2002) or TV broadcast analysts' recommendations (Pari, 1987; Ferreira and Smith, 2003).

[2] Pruitt et al. (2000) do not observe a reversal in prices, but they find that the positive abnormal returns on the announcement day and in the following days are related to increased buying by individual investors.

column have the nature of second-hand information (Lloyd-Davies and Canes, 1978). Some authors state that "HS" columns report rumors about changes in firms' fundamentals (Pound and Zeckhouser, 1990; Beneish, 1991; Pruitt et al., 2000). In some circumstances, the stock market completely anticipates the information content of analysts' recommendations mentioned in the press. Pound and Zeckhouser (1990), focusing on takeover rumors, find no abnormal return on the publication day in the "HS" column and a price run-up in the previous month. Beneish (1991) finds no price reaction on the publication day[3] but significant abnormal returns in the two previous days, when "HS" discusses a single firm. One possible explanation is that the consensus in the "HS" column is formed from analysts' recommendations. An alternative explanation is related to the analysts' incentives to submit information to "HS" before disseminating it to their private clients. This could be the case if the analysts trade on the firms they cover or if they are trying to increase their reputation and visibility through press coverage. However, there are costs in terms of reputation (and potentially also in terms of employment) associated with the possibility that the clients would find out about this unfair behavior (Beneish, 1991).

The PPH studies essentially cover two columns: the weekly *Business Week* column "Inside Wall Street" and the monthly *Wall Street Journal* column "Dartboard" (which is also used in IDH studies). The evidence mainly regards "buy" recommendations. The few studies that also investigate "sell" recommendations (Sant and Zaman, 1996; Lidén, 2007)[4] show a significant price increase for positive advice and no abnormal returns for negative advice; this asymmetric price reaction is difficult to rationalize within the PPH because it is not clear why naïve investors should irrationally react to "buy" recommendations while disregarding "sell" recommendations. Moreover, Albert and Smaby (1996) document that the post-publication price reversal shown in the PPH studies using "Dartboard" has a methodological explanation: most stocks recommended by analysts in the column tend to be momentum stocks; therefore, a pre-event estimate of the market model

[3] For the whole sample, however, the price reaction on the publication day is statistically different from zero.
[4] A third study exists (Trahan and Bolster, 1995), but the sample of "sell" recommendation is limited to eleven observations.

generates inflated alpha values that bias the post-event normal return upward, leading to negative abnormal returns in the days after publication.

In short, both the IDH and the PPH reveal some empirical weaknesses: the doubts on the second-hand nature of "HS" recommendations for the former, and the methodological bias behind the post-publication price reversal and the puzzling asymmetric price reaction for the latter.

Post-publication price performance, however, is not the only way to evaluate the degree of irrationality in the market reaction to second-hand information. In this paper we explore another possibility: the attention-grabbing potential of printed columns disseminating analysts' recommendations. Second-hand information may increase the attention focused on the company, putting price pressure on its stocks (Trahan and Bolster, 1995). We verify the attention-grabbing power of particular second-hand news coverage through the analysis of its consequences on prices and trading volumes of covered stocks. In particular, we contribute to the literature proposing and testing the hypothesis of an asymmetric price and volume reaction to "buy" and "sell" recommendations as evidence of irrationality. We also test whether the attention-grabbing impact on stocks' prices is entirely irrational or if it contributes to market efficiency by spreading public information about firms' fundamentals in two additional ways: looking for a post-publication price reversal and deepening the role of the stocks' popularity.

The Attention-Grabbing Hypothesis (AGH) states that individual investors are net buyers of attention-grabbing stocks (Barber and Odean, 2008). Human beings have bounded rationality; therefore, individual investors face a major search problem in buying decisions because there are thousands of stocks in the investment set from which to choose. In contrast, selling decisions are much easier because the set is limited to stocks already included in the portfolio, given that retail investors usually do not sell short. To simplify the search problem, investors rely on the "availability heuristic" (Tversky and Kahneman, 1974) and confine the investment set to the stocks that capture their attention. Once attention has reduced the choice set, the stocks to buy are picked up following individual preferences, i.e., investors do not buy all of the attention-grabbing stocks

(Odean, 1999). In this perspective, the AGH predicts an asymmetric market reaction to "buy" and "sell" recommendations on the publication day: positive and significant abnormal returns and volumes for "buy" advice and insignificant abnormal returns and volumes for "sell" advice.

Barber and Odean (2008) study the buying and selling behaviors of individual and institutional investors during days on which an event drives investors' attention toward a particular firm's stock. These days are identified by looking at three attention-grabbing events: i) a stock's unusual daily trading volume; ii) a stock's extreme return in the previous day; iii) a mention of the firm in the news of the day. In line with their hypothesis, Barber and Odean find that individual investors tend to be net buyers on high-volume days, following both extremely negative and extremely positive one-day returns and when stocks are in the news. However, professional investors' buying behaviors are not influenced by attention. The news metric (whether a stock appears in the news of the day) proves to be the least informative proxy of attention, but this effect could be due to the fact that available data do not allow measuring the salience of news coverage. The authors also find that attention-driven buying is as strong for large capitalization stocks as for small stocks. Because many pricing anomalies are greater for small stocks than for large stocks, they argue that common psychological trading biases may result in different price reactions depending on firms' capitalization. The focus of Barber and Odean's paper is on investors' behavior, not on the pricing impact of the behavior itself.

As far as we know, our paper is the first to examine the stock price and volume reaction to the dissemination of analysts' recommendations through print media from an attention-grabbing perspective. These elements differentiate our paper from others that test the AGH by focusing on different events. Seasholes and Wu (2007) find that unsophisticated investors are net buyers of stocks that hit their daily upper price limits the day before; they document a transitory impact on prices with reversion to pre-event levels within ten trading days. Fehle, Tsyplakov and Zdorovtsov (2005) study the attention-grabbing potential of the TV commercials in 19 Super Bowl broadcasts

and show that recognizable companies (with a number of ads greater than the sample mean) experience a positive price reaction that persists in the 20-day post-event period.

Our potential attention-grabbing event is the weekly column "The Stock of the Week," which appears in *Plus*, the weekly investment magazine edited by *Il Sole 24 Ore*, the top Italian financial newspaper. The interest for this Italian column is threefold: a) the column reports real second-hand information; b) its format is constant over time; c) individual investors still play a relevant role in the Italian stock market. *Plus* is ready for press on Thursday evening, but it is published two days later, on Saturday (along with the main newspaper). These Saturday columns share the same features: author, page layout, dimension (two pages), position inside the magazine and type of information provided (balance sheet and income statement data, managers' outlook, past stock price performance and analysts' recommendations). Often, but not always, the column also provides analysts' consensus forecast and recommendation as well as the expected price-earnings ratios of comparable companies. These common characteristics make our events homogeneous in terms of attention-grabbing power with the exception of the tenor of analysts' recommendations; by tenor, we mean the average of analysts' recommendations reported in the column that could be either positive or non-positive (neutral or negative). As mentioned, the column does not contain genuine news because all of the data presented and information provided are already part of the public domain. Thus, the data should already be known, at least to professional investors. However, we find a positive abnormal market reaction to the publication of the column when analysts grade the stock as a good opportunity and no reaction at all when the tenor of analysts' recommendations is neutral or negative. This asymmetry is the irrational reaction predicted by the AGH. The finding that the price surge is positively related to the popularity of the stock (proxied by the number of quoted analysts) provides additional support to the AGH and the irrational nature of the market reaction.

2. Data and methodology

2.1 Sample selection and data

We collected all 165 "Stock of the Week" columns published from January 2nd, 2005 to June 30th, 2009 that were devoted to a domestic company listed in the Italian Stock Exchange. In particular, we analyze companies listed in two major markets managed by Borsa Italiana: MTA (Mercato Telematico Azionario) and Expandi. MTA was Borsa Italiana's electronic market, on which stocks, convertible bonds, warrants and option rights were traded. MTA was the main Italian stock market. Expandi was the market dedicated to smaller companies. The two markets had different listing requirements and partially different trading rules. On September 19th, 2005, a new market structure was introduced. In particular, within MTA, companies were divided into three segments: Blue Chip, Star and Standard. Blue Chip is the segment dedicated to companies with a capitalization of over 1 billion euro. Standard is the market for all companies with a capitalization between 1 billion and 40 million euro. Star is the segment for companies with a capitalization of less than 1 billion euro that voluntarily comply with strict requirements on liquidity, transparency and corporate governance. MTA and Expandi merged on June 15th, 2009. Up to the merger with MTA, we include all of the companies listed on the Expandi in the Standard group (eight observations).

The "Stock of the Week" columns covering foreign companies are excluded from the sample because it is unrealistic to think that foreign investors read *Plus* (which is written in Italian) for news about non-Italian companies. Therefore, the column should not affect foreign investors' buying and selling decisions regarding non-Italian listed companies. Furthermore, Italian retail investors tend to hold mainly Italian stocks and trade them in the domestic market (Felettigh and Monti, 2008); thus, their trading is not expected to have a relevant influence on prices and volumes in foreign stock markets. Finally, the foreign companies reported in the column are few, thus, the inclusion of them into the sample would not significantly affect the results.

The final sample includes 154 observations after removing nine columns concerning companies with a short listing history (less than 130 trading days before the column's date), one column

dealing with two companies at once and one column distributed with some delay due to a strike. For each column, we collected the following data: a) name of the company analyzed; b) stock price and the numbers of traded and outstanding shares on a daily basis from 255 trading days before and 10 trading days after the event day (source: DataStream); c) market segment of the listing as of the "event day" (source: Borsa Italiana website); d) the company's sector of activity (source: Borsa Italiana web site); e) company size in terms of book value and capitalization; f) tenor of the analysts' recommendations reported in the column (positive *vs.* neutral and negative); g) consensus earnings forecasts and consensus recommendation reported in the column; and h) number of analysts whose recommendations are reported in the column.

2.2 Sample composition and descriptive statistics

Table 1 shows the composition and the time distribution of our sample in terms of the number of events, availability of analysts' consensus, detailed recommendations and economic sectors.

<<Table 1 about here>>

We selected the time period to include bull and bear stock market cycles of almost equivalent lengths; the turning points from bull to bear and from bear to bull are, respectively, May 31st, 2007, and March 11th, 2009. Our events are not uniformly distributed over time because they are concentrated in the period of 2007-2008 (51% of the sample). This distribution is due to the number of columns covering foreign companies, which was particularly high in the first two years of our sample. Nevertheless, exactly half of the events (77) took place during the bear market cycle (June 1, 2007 – March 10, 2009) and half during the bull market cycle.

The 154 columns examined cover 86 firms because some companies were analyzed more than once, though never in the same year: four companies were the "Stock of the Week" four times each; 13 companies three times; 30 companies two times; and 39 companies one time. The evidence that some stocks are analyzed more than once is due to the fact that the column focuses on mid-caps, thus reducing the universe of firms that can be picked.

Most events are related to companies listed in the Star (51.9%) or Standard (37.5%) segments. The presence of Blue Chips is usually negligible, except for 2006 and 2007, when they represent about 20% of the cases. Analysts' recommendations are reported in all but ten cases (93.5%) and a consensus recommendation is reported in two thirds of the events.

The weight of positive ratings based on analysts' recommendations is slightly higher than the one based on the consensus recommendation reported in the column: 69.9% versus 63.9%.

The time distribution of positive advice varies from 57.9% in 2005 to 72% in 2007 for the analysts' recommendations and from 63% to 76% for the consensus recommendations. We observe the highest fraction of positive analysts' recommendations and consensus recommendations in 2006 and 2007. The lowest values occur in 2005 and 2008 for the analysts' recommendations and in 2008 for the consensus recommendations. The sample includes 17 sectors, none of which exceed, on average, one fourth of the observations; the minimum occurs in 2005 with 10 sectors and the maximum in 2007/2008 with 13 sectors. Not surprisingly given the structure of the Italian economy, the most frequently recurring sectors are *Industrial Good & Services* (22.7%), *Banks* (13%), *Financial Services* (11.7%) and *Construction & Material* (10.4%).

The relevance, for our purposes, of the distinction between events with positive *vs.* neutral or negative recommendations requires the analysis of the characteristics of the two groups. Table 2 reports some descriptive statistics concerning the number of analysts mentioned in the column, the firm's size (book value and capitalization), the price-to-book value, the pre-event market-adjusted performance and the variability of earning forecasts. The book value and the price-to-book value refer to the date of the most recent financial reports shown in the column. The capitalization is the company's market value as of one week before the event day.

The pre-event performance is the stock return in the 250 trading days ending one week before the event day, net of the market index return over the same period. The variability of earnings forecasts is the absolute value of the ratio between the forecast range (the highest minus the lowest forecasted earnings) and the average forecasted earnings for the current year at the date of the column.

<<Table 2 about here>>

The stocks with a good analyst rating have a higher price-to-book ratio and a higher number of mentions of equity research in the column as compared to the stocks with poor ratings. Both groups reveal past over-performance and a medium firm size (capitalization). The first group has better marked-adjusted performance, a lower dispersion of analysts' forecasts and a smaller firm size, although these differences are not statistically significant according to a t-test for means and a Wilcoxon/Mann-Whitney test for medians. The book value and the price-to-book value differ significantly between the two groups.

2.3 Methodology

The tenor of analysts' recommendations is the key variable to investigate the attention-grabbing hypothesis. Each column has a section that synthesizes the most recent equity research covering the "Stock of the Week."

For each column, we measure the tenor of analysts' recommendations by first converting each recommendation into a score according to a standard five-point scale. We then compute the average score.[5] We distinguish between positive and non-positive tenor of analysts' recommendations. Non-positive tenor includes both neutral and negative recommendations. In line with previous studies, neutral and negative recommendations cause similar price reactions (Lloyd-Davies and Canes, 1978; Beneish, 1991).

2.3.1 Abnormal returns

To measure the market reaction to potentially attention-grabbing events, we use a traditional event-study methodology (Brown and Warner, 1980, 1985; Campbell *et al*., 1997). We use three models for normal returns: (1) the Market Model, (2) the CAPM and (3) the four-factor model by Carhart

[5] To get the tenor of analysts' recommendations, we calculated the mean, median and modal scores. The results are unaffected by the choice of central tendency measure. We relay on our computed average recommendation to classify each column as a buy or a sell/hold advice because the consensus recommendation is absent one third of the times. In a few occasions our average recommendation and the consensus recommendation differ but not in a systematic way: in six cases our rating is negative while the consensus is positive; in seven cases the opposite occurs.

(1997). All models lead to similar results. Therefore, we present the results for the four-factor model only. The four factors are constructed using the methodology described in Fama and French (1993) and Carhart (1997).

We consider a 16-day event window [-5; +10] and a 250-day estimation window [-255; -6]. For each firm *i* and time *t*, we define the abnormal return as $AR_{i,t} = R_{i,t} - \mathrm{E}\left(R_{i,t} \mid \mathbf{X}_{i,t}\right)$, where $AR_{i,t}$, $R_{i,t}$ and $\mathrm{E}\left(R_{i,t} \mid \mathbf{X}_{i,t}\right)$ are firm *i*'s abnormal, actual and normal returns, respectively (we consider excess returns over the risk-free rate). Averaging the abnormal returns ($AR_{i,t}$) across firms, we obtain the mean abnormal return at time *t*, $\overline{AR}_t$.

To assess the overall effect of events, we then aggregate the daily mean abnormal returns in the cumulative abnormal return from day τ_1 to day τ_2, $CAR\left(\tau_1, \tau_2\right)$. To test the statistical significance of our results, we perform both parametric (Boehmer *et al.*, 1991) and non-parametric tests (Wilcoxon test). According to Boehmer *et al.* (1991), their parametric test is robust to the presence of event-induced variance at the event day (a common feature of several event studies) and is equally powerful as the traditional test in case of stable variance. All of our inference results are then double checked by constructing bootstrap confidence intervals. Bootstrap confidence intervals are constructed using the procedure described in Greene (2007) by drawing (with replacement) 5000 samples from the full sample of observations.

2.3.2 Abnormal volumes

We perform a similar analysis on volumes.[6] Following Ajinkya and Jain (1989), we define the abnormal volume as $AV_{i,t} = V_{i,t} - \mathrm{E}\left(V_{i,t} \mid \mathbf{X}_{i,t}\right)$, where $AV_{i,t}$, $V_{i,t}$ and $\mathrm{E}\left(V_{i,t} \mid \mathbf{X}_{i,t}\right)$ are security *i*'s abnormal, actual and normal (logarithmic) volume, respectively. As a model for normal volumes, we regress the volume of each firm *i* on the volume of the market as a whole. Averaging the

[6] We also repeat all of the analyses using the turnover instead of volumes. However, the results remain unaffected.

abnormal volume across firms, we obtain the mean abnormal volume at time *t*, $\overline{AV}_t$. The statistical significance of our results is tested as in the case of abnormal returns.

3. Empirical analysis

3.1 Abnormal returns and abnormal volumes

Because the column publication day is always Saturday, our event days are all Mondays. However, after checking for a "Monday effect," we do not detect any such effect in the period under analysis.[7] Considering all available cases, we find a significant positive abnormal return of 0.9% associated with volumes that are 32% higher than normal at the event day. We also observe an abnormal return on day -1, i.e., the Friday preceding the publication of the column. Two major factors can explain the abnormal return on day -1. Because the column is actually printed on Thursday night, insiders could trade on the information available in the column. An insider could be the management of the company covered in the column or the journalist himself. However, we can discard these possibilities given the reputation of the journalist and the strict rules in place in Italy on insider trading by the management of listed companies and journalists.[8] The alternative explanation could be that concurring events in the days preceding our event date may cause the market reaction rather than the column itself. We consider price-sensitive events by analyzing all press releases and newspaper and magazine articles available on the companies' websites in the time window [-1; 0], i.e., since the Friday before the event day. We chose this window because we detect abnormal returns in the day preceding our event date, although no abnormal returns were found in the days before that.

[7] We perform a time-series empirical test for the "Monday effect" before performing our event study. The test is carried out estimating a four-factor model with an additional Monday dummy variable for each firm in our sample in the period considered. Since none of the firms shows a statistically significant Monday dummy, we reject the hypothesis of "Monday effect" in our data.

[8] See the Italian law on financial markets ("Testo Unico della Finanza"). In particular, art. 114 prescribes that companies quoted in regulated stock exchanges, with no delay, have to make inside information publicly available when the information is deemed to be of a precise nature and is likely to significantly influence stock prices. Trading on the grounds of inside news is prosecuted by law (art. 184 and art. 187-bis).

Among potential confounding effects, we check analysts' reports in the same time window because their recommendations could drive investors' decisions and thereby move prices. Taking into account these confounding events, we exclude 34 observations and find that the abnormal return on day -1 disappears, whereas the one on the event date remains positive, statistically significant and of about the same magnitude (0.88%). In this case, volumes are 20% higher than normal. See figure 1. To be parsimonious, we do not report abnormal volumes in the tables and graphs.

<<Figure 1 about here>>

Considering the 80 cases associated with positive tenor and no confounding effects, we find a higher abnormal return (1.16%) and volumes that are about 36% higher than normal. In contrast, there are no statistically significant abnormal returns or abnormal volumes in the occurrences associated with negative tenor in the absence of confounding events. This evidence appears to be in line with the AGH, which predicts positive and significant abnormal returns and volumes for positive recommendations and insignificant abnormal returns and volumes for negative recommendations.

Table 3 shows average abnormal returns at the event date as well as the pre-event and post-event Cumulative Abnormal Returns (CARs) for positively and negatively recommended stocks in Panels A and B, respectively. The post-event period includes day 0 since we are interested in testing whether a price reversal offsets the market reaction in the event day partially or totally.

<<Table 3 about here>>

To test the presence of an asymmetric market reaction typical of the AGH, we distinguish between the two cases: positive and negative tenor. Although, in the tables, we consider the sample with no confounding events, we also check the CARs in the pre-event window [-5; -1] to verify that we eliminated all potential confounding effects. All tests (t-test, Wilcoxon V-statistic and bootstrap confidence intervals) reveal that pre-event CARs in both cases are not statistically significant. Then, we verify if the initial market reaction at the event day is eventually reverted in the following two weeks to test IDH *vs.* PPT. For the positively recommended stocks (Table 3 – Panel A), we observe

a reduction in CARs in the days following the event day; CARs are still positive but are not statistically significant. According to the Wilcoxon test, the only exception is a slightly statistically significant CAR (+0.7%) in the window [0; +5]. It could be that the negative abnormal returns in the first days following the event day are not enough to reverse the initial attention-grabbing effect in the first week of trading.[9] However, it eventually disappears because the CAR in the window [0; +10] is not statistically different from zero, i.e., we observe a complete reversal of the positive AR on the event day. These results are in line with the PPH: the column seems not to convey any value to investors but only to initially attract their attention. The case of negatively recommended stocks (Table 3 – Panel B) is peculiar because we do not find any abnormal returns at the event day or in the following two trading weeks.[10,] In general, the rarity of negative recommendations might produce a more intense price reaction. Since, we do not observe such a reaction in case of negative tenor, this could be taken as evidence in favor of the AGH. It seems that only the positively recommended stocks are able to attract investors' attention, as the AGH predicts. In the literature, just Lidén (2007) and Sant and Zaman (1996) document similar asymmetric price reactions on the publication day, although in the latter case, the negatively recommended stocks experience a significant price decline on day +1.

3.2 Regression analysis of abnormal returns and volumes

In the previous section, we detect a market reaction on the event day in the case of positive tenor. In this section, we investigate the potential determinants of this market reaction through regression analysis. In particular, we propose two regression models: one for abnormal returns and one for abnormal volumes. We concentrate only on positively recommended stocks because we do not detect any market reaction for negatively recommended stocks.[11]

[9] This result can also be a consequence of the less power of non-parametric tests and, thus, should be interpreted with caution as it can be misleading.
[10] According to the Wilcoxon V-stat, we only find a slightly significant negative CAR in the window [0; +10]. The same consideration on the power of non-parametric statistics of the previous footnote applies here.
[11] Because the ARs and AVs of negatively recommended stocks are not statistically different from zero, the dependent variable would be a "vector of zeros."

Among the covariates that could explain ARs and AVs, we consider several variables: the number of analysts mentioned in the column; the pre-event market-adjusted stock performance; a dummy variable indicating the presence of earning forecasts in the column; the firm's size (natural logarithm of market capitalization); the price-to-book value; a dummy variable indicating the presence of any confounding effect; dummy variables indicating the industry of the stock; and dummy variables for the year of the column. In section 2, we described and presented some descriptive statistics for these variables.

Because we use a four-factor model to detect abnormal returns, previous performance, size and price-to-book variables should already be taken into account indirectly by the four factors and we should find no statistically significant effect associated with these variables in our regression for abnormal returns. After having estimated a regression model including these variables (as a robustness check), we indeed find that they are not statistically significant. These variables are also not significant for AVs, so we exclude them from the AV regression. For this reason, in Table 4, we present the final – reduced – version of our regression model, which only includes the economically relevant explanatory variables (i.e., number of analysts; presence of earnings forecast; confounding effects; industry and year).

We do not report the coefficients associated with all the industry and year dummies to preserve space. However, in the middle section of Table 4, we present a joint Wald test on all the coefficients to evidence any Industry or Year effect on our response variable. While no industry effect is present, we observe a significant year effect on the abnormal returns. This is due to slightly larger abnormal returns in 2009. More in general, abnormal returns and volumes tend to remain stable and not diminish over time, i.e. the differences among years are not statistically significant, suggesting that the attention-grabbing effect does not diminish over time. This evidence seems not only to support our AGH, but also its "irrational" explanation. From a rational point of view, we could expect that the column, apart from grabbing investors' attention, could provide some value to them by publicizing a company that before was not well known. Thus, in this case, we should expect a

reduction of the attention-grabbing effect over time. Since several stocks in the sample are associated with more than one observation, we test for the presence of any firm-specific effect on abnormal returns and abnormal volumes. The result of two LR-tests indicates that this effect is indeed not relevant to the abnormal returns, but is relevant to the abnormal volumes. The sign and significance of the coefficients in the regression of abnormal volume remain, however, unchanged by the inclusion of these firm-specific dummies with respect to the more parsimonious model presented in the table. An additional robustness check shows that the first time a company with multiple observations is recommended, its market reaction is not larger than the market reaction registered for the following observations. Also this evidence supports the AGH.

<<Table 4 about here>>

Before commenting on the results (Table 4), we observe that our specification tests do not reject the two models at all conventional levels of significance.[12]

After controlling for contextual confounding effects, industry effects and year effects, we focus on the two main variables of the regression: number of analysts and presence of earnings forecasts. The number of analysts cited in the column has a positive and significant coefficient in both regressions. This positive influence on price and volume is in line with the AGH and contrast the IDH. Ex-ante, the number of analysts may be considered as a proxy for either the popularity enjoyed by the company in the investor community or the information set available to the market.[13] If the column conveyed new information, more information already available on the market (i.e., more analysts following) would result in smaller ARs (negative coefficient). Instead, because the columns simply attract the attention of investors with no additional new information, it is natural to observe a greater reaction (positive coefficient) for the most "glamorous" stocks (i.e., the stocks most

[12] We consider the Reset general specification test, the Breush-Pagan heteroskedasticity test, and the Shapiro-Wilk normality test. The latter test rejects the hypothesis of normality for the AR model. Thus, given the reduced number of observations, caution is needed in making inferences from this model.

[13] It could be argued that the variable "No. Analysts" may reflect a liquidity effect rather than measure the popularity of the stock or the information set available. For this reason, as a test of robustness, we estimated a model including the pre-event average turnover among the explanatory variables. However, the coefficient associated with this variable is not statistically significant and the coefficients of all the other variables included in the model are unaltered by the inclusion of this variable.

commonly followed by analysts).[14] It is worth mentioning that Sant and Zaman (1996), despite presenting an asymmetric reaction as well, find the opposite result with respect to the relationship with the number of analysts; in their study, the positive abnormal market reaction at the time of the distribution of *Business Week* affects only the stocks followed by fewer than twenty analysts (ten for reports with an analyst as a source) and the stocks in this group show a price reaction that increases as the number of analysts decreases. Our results are in line with the evidences in Fehle, Tsyplakov and Zdorovtsov (2005) who find a positive relationship between the price reaction and the firm's notoriety. Instead, the presence of an earnings forecast reduces abnormal returns and has no effect on abnormal volumes. To understand the negative effect on ARs, it is useful to note that when earnings forecasts are available in one column, the consensus recommendation is also available. Thus, the technical level and the amount of information available in the column increase when earnings forecasts are available. Because the attention-grabbing effect has an emotional nature, it is clear that substantial and technical information increases the complexity of the column, thus reducing the attention-grabbing effect.

4. Conclusion

This paper deals with a long-standing issue in finance: whether the market reaction to second-hand information is due to price pressure or information dissemination. We adopt the perspective of attention grabbing (Barber and Odean, 2008) as a particular form of price pressure. More precisely, we argue that if the market reaction has an attention-grabbing motivation, the publication of positive recommendations should induce a significant increase in the prices and volume of trading, whereas the publication of negative or neutral recommendations should have no effect. This

[14] In principle, it would be possible to argue that the attention-grabbing effect could be smaller if a stock is already popular since investors would already be aware of it. This alternative story would hold only in case of a "rational" reaction of investors in recognizing the value of the column in attracting their attention on a stock not previously known. However, as the attention-grabbing effect does not diminish over time, the evidence we observe exactly the opposite, i.e. an "irrational" reaction of investors. In this case, the attention-grabbing effect is larger for glamour stocks, as we claim in the text.

emotional price reaction on the event day is also expected to revert in the post-event period. Our evidence supports both predictions. The attention grabbing theory allows us to predict an asymmetric market reaction, which has already been detected in a few other empirical studies but is otherwise difficult to rationalize within the standard price pressure hypothesis.

Contrary to the available evidence, we document a positive relationship between the number of analysts quoted in the column and the price (volume) increase. Because we are dealing with an attention-grabbing event, this result is in line with economic theory. The number of analysts may be considered as a proxy for the popularity enjoyed by the company in the investors' community and for the information set available to the market. If the column conveyed new information, more information available on the market (i.e., more analysts following) would result in smaller abnormal returns. Instead, because the columns simply attract the attention of investors with no additional information, it is natural to observe a greater reaction for the most "glamorous" stocks (i.e., the stocks that are most commonly followed by analysts).

To the best of our knowledge, this paper is the first to examine the stock price reaction to the dissemination of analysts' recommendations through print media from an attention-grabbing perspective. In particular, we contribute to the literature by proposing and testing the hypothesis of an asymmetric price reaction. These elements differentiate our paper from others that test the attention grabbing theory by referring to different types of events.

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Table 1 - Sample composition

The table shows the composition and the distribution in time of our sample. Number of events, availability of analysts' consensus, detailed recommendations and economic sectors are considered.

	Total		2005		2006		2007		2008		2009.1H	
	Obs.	**%**	**Obs.**	**%**	**Obs.**	**%**	**Obs.**	**%**	**Obs.**	**%**	**Obs.**	**%**
Columns	154	100	24	15.58	27	17.53	34	22.08	45	29.22	24	15.58
Columns by Stock Market Segment												
Blue Chips	19	12.34	2	8.33	6	22.22	6	17.65	3	6.67	2	8.33
Star	80	51.95	13	54.17	11	40.74	18	52.94	27	60.00	11	45.83
Standard and Expandi	55	35.71	9	37.50	10	37.04	10	29.41	15	33.33	11	45.83
Total	**154**	**100**	**24**	**100**	**27**	**100**	**34**	**100**	**45**	**100**	**24**	**100**
Columns by Consensus Recommendation												
Positive	72	46.75	2	8.33	19	70.37	22	64.71	17	37.78	12	50.00
Neutral and Negative	31	20.13	1	4.17	6	22.22	8	23.53	10	22.22	6	25.00
No Consensus	51	33.12	21	87.50	2	7.41	4	11.76	18	40.00	6	25.00
Total	**154**	**100**	**24**	**100**	**27**	**100**	**34**	**100**	**45**	**100**	**24**	**100**
Columns by Analysts' Recommendation												
Positive	92	59.74	11	45.83	18	66.67	22	64.71	26	57.78	15	62.50
Neutral and Negative	52	33.77	8	33.33	7	25.93	11	32.35	18	40.00	8	33.33
No Recommendations	10	6.49	5	20.83	2	7.41	1	2.94	1	2.22	1	4.17
Total	**154**	**100**	**24**	**100**	**27**	**100**	**34**	**100**	**45**	**100**	**24**	**100**
Columns by Company's Economic Sector												
Industrial Goods and Services	35	22.73	5	20.83	8	29.63	9	26.47	9	20.00	4	16.67
Banks	20	12.99	4	16.67	4	14.81	2	5.88	6	13.33	4	16.67
Financial Services	18	11.69	3	12.50	4	14.81	3	8.82	5	11.11	3	12.50
Construction and Materials	16	10.39	2	8.33	3	11.11	3	8.82	4	8.89	4	16.67
Personal and Household Goods	11	7.14	1	4.17	2	7.41	3	8.82	3	6.67	2	8.33
Technology	11	7.14	2	8.33	1	3.70	4	11.76	3	6.67	1	4.17
Automobiles and Parts	10	6.49	2	8.33	1	3.70	3	8.82	4	8.89	0	0.00
Utilities	7	4.55	2	8.33	0	0.00	1	2.94	3	6.67	1	4.17
Media	5	3.25	1	4.17	1	3.70	0	0.00	2	4.44	1	4.17
Health Care	5	3.25	2	8.33	0	0.00	1	2.94	2	4.44	0	0.00
Retail	5	3.25	0	0.00	1	3.70	1	2.94	2	4.44	1	4.17
Chemicals	4	2.60	0	0.00	1	3.70	2	5.88	0	0.00	1	4.17
Insurance	2	1.30	0	0.00	0	0.00	1	2.94	1	2.22	0	0.00
Oil and Gas	2	1.30	0	0.00	0	0.00	0	0.00	1	2.22	1	4.17
Basic Resources	1	0.65	0	0.00	0	0.00	1	2.94	0	0.00	0	0.00
Food and Beverages	1	0.65	0	0.00	1	3.70	0	0.00	0	0.00	0	0.00
Telecommunications	1	0.65	0	0.00	0	0.00	0	0.00	0	0.00	1	4.17
Total	**154**	**100**	**24**	**100**	**27**	**100**	**34**	**100**	**45**	**100**	**24**	**100**

Table 2 – Events by analysts' recommendation: descriptive statistics

The table reports descriptive statistics on the number of analysts mentioned in the column, the firm's size (book value and market value), the price-to-book ratio, the pre-event market-adjusted performance and the variability of earning forecasts. In the first panel, statistics refer to the entire sample. In all other panels, statistics are reported for two distinct groups: positively recommended stocks and non-positively recommended stocks. At the bottom of the table, equality tests for the means (t-test) and medians (Wilcoxon/Mann-Whitney) of the two groups are reported.

	Obs.	Mean	Median	Min	Max	Std. Dev.
All Recommendations						
Number of Analysts	154	4.80	4	0	18	3.08
Size: Book Value (mln €)	153	379	216	-131	2968	506
Size: Capitalization (mln €)	154	684	468	107	4534	718
Price-to-Book Value	151	2.56	2.02	0.41	24.20	2.32
Mkt. Adj. Pre-Event Stock Performance (%)	154	10.80	5.40	-44.90	106.60	27.70
Variability of Earnings Forecasts (%)	99	58.90	20.50	0.50	1484.00	180.80
Positive Recommendations						
Number of Analysts	92	5.50	5	1	18	2.96
Size: Book Value (mln €)	92	245	174	-131	848	198
Size: Capitalization (mln €)	92	577	479	116	2483	386
Price-to-Book Value	90	2.98	2.29	0.59	24.20	2.76
Mkt. Adj. Pre-Event Stock Performance (%)	92	12.60	7.40	-44.90	83.50	28.10
Variability of Earnings Forecasts (%)	69	49.90	17.60	0.50	900.00	128.60
Neutral or Negative Recommendations						
Number of Analysts	52	4.50	4	1	11	2.70
Size: Book Value (mln €)	52	536	270	36	2968	702
Size: Capitalization (mln €)	52	707	435	107	4534	873
Price-to-Book Value	52	1.94	1.53	0.41	7.54	1.30
Mkt. Adj. Pre-Event Stock Performance (%)	52	5.30	2.60	-34.80	69.60	24.00
Variability of Earnings Forecasts (%)	30	79.60	22.60	3.70	1484.00	266.50
Equality Tests (p-values)						
Number of Analysts		0.044	0.038			
Size: Book Value		0.000	0.001			
Size: Capitalization		0.221	0.438			
Price-to-Book Value		0.012	0.000			
Mkt. Adj. Pre-Event Stock Performance		0.116	0.136			
Variability of Earnings Forecasts		0.456	0.112			

Table 3 – ARs and CARs for the positively (Panel A) and negatively (Panel B) recommended stocks

The table reports ARs and CARs for positively recommended stocks (Panel A) and negatively recommended stocks (Panel B) in several time windows around the event day. To take into account potential confounding events around the event day, we exclude 34 observations from the analysis. To test the statistical significance of CARs, the table reports the t-tests, 95% bootstrap confidence intervals and non-parametric Wilcoxon V-stats.

	CAR (%)	t-stat	p-value	Sign.	Lower CI	Upper CI	Sign.	V-stat	p-value	Sign.
Panel A: Positive Rating - No Confounding Effects (No. Obs. = 80)										
Pre-event [-5; -1]	0.42	0.99	0.326		-0.005	0.012		1925	0.144	
AR Event day [0]	1.16	4.05	0.000	***	0.006	0.017	**	2430	0.000	***
Post-event [0; +5]	0.70	1	0.321		-0.007	0.020		2090	0.024	*
Post-event [0; +10]	0.08	0.1	0.921		-0.016	0.016		1816	0.348	
Panel B: Negative Rating - No Confounding Effects (No. Obs. = 35)										
Pre-event [-5; -1]	0.44	0.64	0.527		-0.009	0.018		338	0.716	
AR Event day [0]	0.36	1.17	0.250		-0.002	0.010		365	0.422	
Post-event [0; +5]	-1.08	-1.68	0.102		-0.023	0.001		224	0.140	
Post-event [0; +10]	-0.85	-0.7	0.490		-0.030	0.017		183	0.030	*

***, ** and * indicate statistical significance at the 0.01, 0.05, 0.1 levels, respectively.

Table 4 – Regressions for ARs and AVs of positively recommended stocks

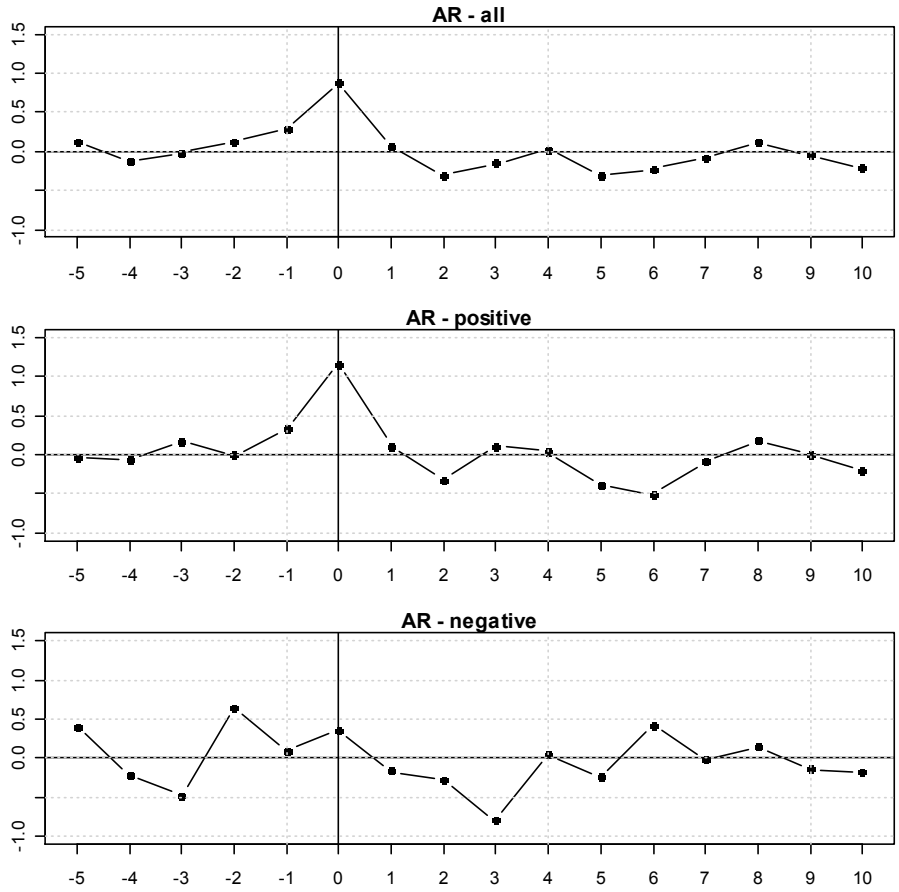
The table reports regression models for the ARs and AVs of positively recommended stocks. Coefficients, standard errors and significance levels associated with each explanatory variable are presented. In the middle section of the table, we report a joint Wald test of zero restriction for all the coefficients associated to the Industry and Year dummies included in the model (and not presented in the table). At the bottom of the table, some post-estimation diagnostic tests are reported: Reset general specification test; Breush-Pagan heteroskedasticity test; and Shapiro-Wilk normality test.

	AR_0 Positive Recommendations			**AV_0 Positive Recommendations**		
Regression	**Coeff.**	**S.E.**	**Sign.**	**Coeff.**	**S.E.**	**Sign.**
Intercept	0.00	1.36		0.22	0.49	
No. Analysts	0.27	0.14	*	0.09	0.05	*
Earnings Forecast	-1.64	0.86	*	-0.43	0.31	
Confounding Effect	0.59	0.90		0.57	0.33	*
Joint Effects		**Stat.**	**Sign.**		**Stat.**	**Sign.**
Industry effect	F(13,65)	0.89		F(13,65)	0.74	
Year effect	F(4,65)	2.17	*	F(4,65)	0.84	
Multiple R-squared	0.27			0.27		
N	86			86		
Diagnostic		**Stat.**	**Sign.**		**Stat.**	**Sign.**
Reset test		0.59			0.09	
Breusch-Pagan test		18.37			20.99	
Shapiro-Wilk test		0.97	*		0.98	

***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.1 levels, respectively

Figure 1 – Average abnormal returns around the event day (no confounding effects)

This figure plots average abnormal returns in the event window [-5; +10] around the event date. The first plot refers to all observations. The second and third plots refer to positively recommended stocks and non-positively recommended stocks, respectively. To take into account potential confounding events around the event day, we exclude 34 observations from the analysis.



Appendix

Table A.1 - Event studies regarding analysts' explicit and implicit recommendations published in print media (Information Dissemination Hypothesis)

Empirical study	Newspaper / Magazine	Column / Frequency		Period	Recommendations		AR(t=0)		AR reversal		AV(t=0)
					No	Type			Short	Long	
Lloyd-Davies and Canes (1978)	Wall Street Journal (N)	Heard on the Street	Daily	1970-71	597	Buy	Yes	+0.92%	No	-	-
					188	Sell	Yes	-2.37%	No	-	-
Syed et al. (1989)	Wall Street Journal (N)	Heard on the Street	Daily	1983-84	16	Buy*	Yes	+0.98%	No	-	-
Pound and Zeckhouser (1990)	Wall Street Journal (N)	Heard on the Street	Daily	1983-85	42	Takeover rumors	No	+0.07%	No	No	-
Liu et al. (1990)	Wall Street Journal (N)	Heard on the Street	Daily	1982–85	566	Buy	Yes	+1.54%	Partial	-	Yes
					286	Sell	Yes	-1.99%	No	-	Yes
Beneish (1991)	Wall Street Journal (N)	Heard on the Street	Daily	1978–79	286	Buy	Yes	+1.01%	No	-	-
					118	Sell	Yes	-1.00%	No	-	-
Liu et al. (1992)	Wall Street Journal (N)	Heard on the Street	Daily	1982-84	332	Buy	Yes	+1.87%	Partial	-	Yes
				1982-84	172	Sell	Yes	-2.30%	No	-	Yes
				1984-85	234	Buy	Yes	+1.09%	No	-	Yes
				1984-85	114	Sell	Yes	-1.53%	No	-	Yes
Barber and Loeffler (1993)	Wall Street Journal (N)	Dartboard	Monthly	1988-90	95	Buy*	Yes	+3.53%	Partial	-	Yes
Palmon et al. (1994)	Business Week (M)	Inside Wall Street	Weekly	1983-89	280	Buy	Yes	+1.91%	No	-	Yes
					49	Sell	Yes	-0.67%	No	-	No
Desai and Jain (1995)	Barron's (M)	Annual Roundtable	Annual	1968-91	1559	Buy	Yes	+1.04%	No	No	-
					152	Sell	Yes	-1.16%	No	No	-
Albert and Smaby (1996)	Wall Street Journal (N)	Dartboard	Monthly	1988-91	140	Buy	Yes	+3.21%	No	No	Yes
Desai et al. (2000)	Wall Street Journal (N)	All-Star Analyst Survey	Annual	1993-96	1157	Buy	Yes	+0.42%	No	No	-
Pettengill and Clark (2001)	Wall Street Journal (N)	Dartboard	Monthly	1990-99	446	Buy*	Yes	+2.77%	No	Partial	-

^ Editor's and analysts' recommendations
* Including sell recommendations (the study reverses the sign of the ARs for these securities)
° Three-day period (from -1 to +1)
Yes = statistically significant

Table A.2 - Event studies regarding analysts' explicit and implicit recommendations published in print media (Price Pressure Hypothesis)

Empirical study	Newspaper / Magazine	Column / Frequency		Period	Recommendations		AR(t=0)		AR reversal		AV(t=0)
					No	Type			Short	Long	
Wijmenga (1990)	Elseviers Magazine (M) Beleggers Belangen (M) de Financiele Koerier (M)		Weekly	1978-83	329	Buy	Yes	-		Yes	-
Metcalf and Malkiel (1994)	Wall Street Journal (N)	Dartboard	Monthly	1990-92	120	Buy	Yes	+3.24%	-	Yes	-
Wright (1994)	Wall Street Journal (N)	Dartboard	Monthly				Yes				
Trahan and Bolster (1995)	Barron's (M)	Up and Down Wall Street. Investment News and Views	Weekly	1988	144	Buy^	Yes	+2.10%	Yes	Yes	-
					11	Sell	Yes	-0.93%	-	-	-
Mathur and Waheed (1995)	Business Week (M)	Inside Wall Street	Weekly	1981-89	233	Buy	Yes	+1.71%	-	Yes	Yes
Sant and Zaman (1996)	Business Week (M)	Inside Wall Street	Weekly	1976-88	328	Buy	Yes	+1.16%	No	Yes	Yes
Sant and Zaman (1996)	Business Week (M)	Inside Wall Street	Weekly	1976-88	40	Sell	No	-0.25%	No	No	-
Liang (1999)	Wall Street Journal (N)	Dartboard	Monthly	1990-94	216	Buy*	Yes	+2.84%	Yes	Yes	Yes
Pruit et al. (2000)	Wall Street Journal (N)	Dartboard	Monthly	1994-95	92	Buy	Yes	+3.46%	No	-	Yes
Lidén (2007)	Six Swidish M and N		Daily. Weekly. Monthly	1995-00	566	Buy	Yes	+0.37%	Yes	Yes	Yes
					42	Sell	No	-0.36%	No	No	No
Palmon et al. (2009)	Business Week (M)	Inside Wall Street	Weekly	2002-03	551	Buy	Yes	+4.61%°	Yes	Yes	Yes

^ Editor's and analysts' recommendations

* Including sell recommendations (the study reverses the sign of the ARs for these securities)

° Three-day period (from -1 to +1)

Yes = statistically significant