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DAILY COVERAGE OF LISTED COMPANIES ON THE ITALIAN PRESS**

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# What Do Ads Buy?

## Daily Coverage of Listed Companies on the Italian Press\*

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### Abstract

We match data on the daily newspaper coverage of a sample of Italian listed companies with Nielsen data on the monthly amount of advertising that a given company has purchased on a given newspaper. Controlling for newspaper and company fixed effects, we show that newspaper coverage of a given company is positively related with the amount of ads purchased on that newspaper by that company. We also find that coverage of a company is higher the day after a press release, but especially so on newspapers where more ads are purchased. This result on press releases is robust to controlling for ownership links between newspapers and companies, and –more generally- controlling for time invariant features of each company-newspaper pair, i.e. for (company  $\times$  newspaper) fixed effects. Moreover, coverage is correlated with past day absolute return and trading volume, and this relationship appears to be steeper for those newspapers where more ads are purchased.

**JEL Classification:** K1; L2; N81

**Keywords:** Media Bias, Advertising, Press Releases, Stock Returns, Italian Press

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## 1. Introduction

The media is the primary example of a two-sided market, whereas readers and viewers are offered valuable informative or entertainment content, while advertisers are sold the attention of the former. However, as highlighted in a recent game-theoretical model by Ellman and Germano (2009), advertisers could be interested not only in buying space on media outlets, but also in influencing what is featured in the so called “news hole”, i.e. the space where news and editorial content appear. This is the case, since the receptiveness of consumers to ads could be negatively influenced by media content that is at odds with the products themselves being advertised. By the same token, pieces of news that appear to be “objective” are likely to have a stronger persuasive effect on consumers than proper ads, so that there is a clear incentive to disguise ads as news stories.

Ellman and Germano define this as the “regulatory view” on advertising. On the other hand, according to the “liberal view”, advertising revenue has a positive influence on the quality of information provided by the media, since it allows them to be less prone to the influence of the incumbent government (Besley and Prat 2006) and of political parties (Gentzkow *et al.* 2006). At the end of the day, the comparative relevance of the regulatory and the liberal view of advertising must be assessed empirically. Yet, there is little evidence on this, with two important exceptions, which are both more consistent with the regulatory view of advertising. Reuter and Zitzewitz (2006) examine the correlation between mutual fund recommendations and past advertising expenditure on three personal finance publications and on two national newspapers, the *New York Times* and the *Wall Street Journal*. They find that, controlling for fund characteristics and other confounding factors, there is a significantly positive correlation between ads and positive mentions on the three personal finance outlets, but not on the *Times* and the *Journal*. Moreover, a recent paper by Di Tella and Franceschelli (2009) shows that there is a negative and sizeable correlation between the amount of ads purchased by the Argentinean government on national daily newspapers and the amount of front page coverage that those newspapers devote to corruption scandals involving members of the incumbent government.

In this paper we provide new evidence on the link between advertising and media content, with a specific focus on the coverage of firms. More specifically, we investigate how a sample of 13 Italian companies listed on the stock market is covered on a daily basis by 6 different newspapers during the period 2006-2007, as a function of the monthly amount of ads being purchased by each company on each newspaper. We gather data on daily media coverage by performing automatic keyword-based searches of online news archives. Controlling for time-invariant characteristics of

companies and newspapers, we find that newspaper coverage of a given company is positively and significantly related with the amount of ads purchased on that newspaper by that company.

As we will more thoroughly discuss in the next section, through their public relations (PR) departments companies themselves are a primary source of information for the media and the public about anything newsworthy happening to them: information flows from the company to the media and the public take the shape of routinely issued press releases. For our sample of companies we perform automatic searches of their own archives in order to obtain the exact dates when press releases are issued. Again controlling for newspaper and company fixed effects, we find evidence that coverage of a given company is much larger the day after a press release. But it is also the case that this increase in coverage is systematically larger on newspapers where that company has purchased more ads the month before. This latter finding is statistically stronger when adding controls for the coverage of a firm by a newspaper that is (at least partially) controlled by that company. It is also robust to a more demanding empirical specification, whereas we control for time-invariant characteristics of each company-newspaper pair, i.e. we exploit the *time* variation in media coverage, advertising expenditure and press release issuance.

In principle, companies enjoy sizeable degrees of freedom when choosing whether to issue a press release, and what to include into it. In fact, financial regulations typically oblige listed companies to disclose price-sensitive information in a timely fashion through a press release. But this does not imply that all newsworthy information about a given company is included in its press releases.

In order to proxy for the “residual” flow of real world events about a company that is not necessarily captured by its press releases, we expand our analysis of newspaper coverage by controlling for the absolute daily return of that company on the stock market. It is also the case that a large movement in the price of a given stock is newsworthy *by itself*, irrespective of the presence of other newsworthy events causing it.

In fact, we find that the coverage of a given company is positively and significantly correlated with past day absolute return. There is also some evidence that this relationship is systematically *steeper* the larger the amount of ads being purchased by that company on that newspaper. However, when distinguishing between positive and negative returns, only the interaction of ads expenditure with *positive* returns is mildly significant. This latter result is quite robust to the more demanding specification described above, namely controlling for (company  $\times$  newspaper) fixed effects. In other terms, newspapers appear to be reacting more strongly to (positive) company-specific newsworthy events, the larger the purchases of ads by that company.

Our results are also related to some recent literature on the links between media coverage and the behavior of financial markets. For example Barber and Odean (2008) show that individual investors appear to be net buyers of stocks being featured in the news, irrespective of the positive or negative tone of the news itself. If this is the case, our results point to an interesting synergy between the marketing and the investor relation department within listed companies: according to our findings, when a company buys ads on a newspaper, it also buys some additional attention of the newspaper to newsworthy events, which can induce readers as investors to be more willing to buy shares of that company. This in turn could translate in higher stock prices in equilibrium, i.e. a lower cost of capital for the firm (Fang and Peress 2008).<sup>1</sup>

On top of the contributions on advertising & media coverage and on media & finance, our paper is also related to the comparatively larger literature on political media bias (Groseclose and Milyo 2005, Gentzkow and Shapiro 2009, Puglisi 2006, Larcinese *et al.* 2007, Puglisi and Snyder 2008, Ho and Quinn 2008, Knight and Chiang 2008, Durante and Knight 2009).

The paper is organised as follows. In section 2 we provide some background on the activities performed by firms' PR departments and on the interactions of those with media organizations. In section 3 we describe the dataset, while in section 4 we present our main results, and in section 5 we perform some robustness checks. Section 5 concludes.

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<sup>1</sup> Peress (2008) investigates the link between media coverage and the extent of the earnings announcement drift, i.e. the predictability of stock returns after earnings announcements.

## **2. The internal organization of newspapers**

The fact that a company and/or its products are covered by the media creates informative externalities. Those externalities (of a positive or a negative sign) can arise both in the product and in the financial market. If this is the case, the company in question can find it optimal to engage in public relation activities, in order to enhance or to influence editorial coverage.

To investigate this information dissemination activity, and its interactions with advertising and news selection, we have carried out 20 personal interviews with the different stakeholders involved (PR agencies, PR executives, newspaper editors in chief, publishers, newspaper sales executives).

Companies value editorial space because (i) it is cheaper than advertising space and (ii) the news selection process carried out by the editorial team can attribute to a piece of news a degree of relevance and credibility that are difficult to obtain only through the means of advertising.

Even if they usually claim a more elaborate communication support, PR agencies routinely evaluate their output by collecting the articles they have obtained for a particular client, and multiplying the obtained position-weighted space by the appropriate price that one would pay for advertising that covers the same spaces and positions. This sum must be lower than the agency fee as a bottom line for efficiency.

Since the publication of a press release is free –conditional on the fact that the newspaper staff selects it–, companies compete fiercely on the intermediate information “market” where they can obtain valuable editorial space. The journalists we have interviewed, both in newspaper and magazines, declare to receive on average between 20 and 40 press releases on a daily basis, from which they pick up 1-2 news/articles per day. Since the same press release is sent to several journalists working for the same outlet, a conservative estimate of the publication rate on newspapers is around one article for every ten press releases. In specialized magazines, which are typically more focused on a particular topic, and where the matching between company disclosure and editorial interest is easier, the publication rate is higher, usually around one news every 3 or 4 press releases.

But this dissemination activity is important for media companies as well, since it reduces the costs to gather and verify the information to be published. In a typical newspaper, around 60% of published stories originate from some sort of public relation activity performed by firms and organizations. Moreover, following the enlargement of topics covered and the growth in the number of pages, this share has been steadily growing over the last twenty years (Gambaro 2007, Boyd Barret 1992).

According to Upa, in 2007 Italian companies spent 2013 million euros on public relation activities, and the growth rate in the previous 6 years has been more than double than the one for advertising on newspaper and magazines. This amount represents about 0.15% of GDP and around 10% of the total communication expenditure. Obviously public relations include other activities than media or investor relation, which anyway represent around half of total expenditure.

In Italy Public Relation officers, both internal and outsourced, are estimated in the range between 20,000 and 50,000 and they confront, or try to influence, 10068 journalists that are employed in the Italian press (2007 figure).

The newsgathering activity performed by a newspaper can be suitably described within a principal-agent setting, whereas the newspaper acts as an agent that selects news on behalf of its (collective) principal, i.e. the readers. The principal cannot perfectly observe the actions of the agent nor the intermediate market, which is fed by news agencies and press releases. This is the market where the newspaper on a daily basis would pick up the pieces of news to be published.

In a nutshell, the editor-in-chief selects the more relevant news and chooses the level of effort needed to study, check and write them down. When doing so, he would follow some sort of editorial line that is welcome to the readers.

A certain amount of effort and costs would on average translate in a given amount of precision, appropriateness and completeness for each published piece of news.

The maximum effort is given to the more relevant stories of the day, but on the margin there are several combinations of effort and relevance that can offer the same output to the reader. From this point of view, the editor can select the stories to be published on the basis of some type of portfolio considerations.

When the piece of information is related with a company or its products, a story-specific investment in disclosure and dissemination (press release, photos, contacts) can lower the cost for the newspaper to produce that news and therefore modify the rank of final relevance.

This is in some sense a grey zone, because it is unclear whether the PR activity performed by firms can be considered as a clear-cut instance of media capture (Besley and Prat 2006). Indeed, as discussed above newsworthiness and precision-enhancing effort must be jointly taken into account and they are both valuable to the reader, so that there is not an ex ante definite ranking of potential stories. On the other hand this is an equilibrium phenomenon, in that a company has no reason to engage in a costly activity if the news regarding it is published anyway.

In this setting the focus of the pushing company is on the (potentially) free editorial space, which must be compared with costly advertizing, and the informative value given to the published story by the selection process itself.

There are circumstances where the company tries to soften or to erase a bad news. This can only occur in a dynamic setting, i.e. when the PR executive has a stable relationship with the journalist. Over time she gives the reporter exclusive news or valuable information; once she has credit, she can ask for some deviation from the editorial selection standard. The rational reporter must consider the actual value of the relationship over the future years and trade it off against the intensity of slant which is required on that particular occasion. Private incentives might play a relevant role here: for example, some valuable information can improve the reporter's position and increase her salary.

A third typical situation is when a company is involved in a rent seeking activity. In this case the publication of a story containing the appropriate information is only a part of a larger process that usually includes (i) the hiring of some academics that would draft a piece of research matching the company goals and (ii) inducing the right person (usually public officials or decision makers) to read and pay attention to the obtained article. The information and the piece of research must be of interest for a large chunk of the readers in order to get published, but the only readers that matter to the company are those that ultimately decide about the rent.

While there are several qualitative and anecdotal papers on the relationship between public relation officials and journalists, and its effects on media output, only recently have more rigorous and quantitative studies emerged, mainly in the financial sector.

Bushee and Miller (2007) study a sample of 184 midsized companies that hired Investor Relation firms, and find that they have significant increase in disclosure, press coverage and trading activity.

In the three setting described above the company can leverage on its advertising expenses over that particular newspaper both with the carrot of spending more, and with the stick of spending less (or completely withdrawing the advertising). While PR practitioners generally claim not to engage in this practice, this is perceived as a problem by journalists. In fact, media organizations adopt several institutional arrangements to deal with this problem.

Other things being equal, this leverage is more powerful when the advertising revenues per copy are larger, the advertising client are more concentrated both in number and by sectors, and when the publication is weaker.

When there is an exchange between advertising and coverage a newspaper can lose copies but the increased advertising can more than compensate this loss (Di Tella Franceschelli 2009).

From the company perspective, private incentives of top managers can play a significant role. Since the information ends up being mixed with entertainment and being personalized in stories and adventures, top managers receive an extra media exposure and can transform the company investment into private benefits such as salaries, stock options and future positions (Nguyen 2005).

Following the seminal work of Reuter and Zitzewitz (2006) some papers have studied the interaction between advertising and coverage.

Gurun and Buttler find that on U.S. newspapers there is on average a more positive slant in articles about local companies (as identified by the distance between the newspaper's and the company's headquarters) than about non-local ones, and they present evidence that this slant is linked with local advertising expenditure.

Advertising can influence the editorial line of a newspaper also in more indirect and general way. Gabszewicz, Laussel and Sonnac (2001) propose a model where in order to get larger advertising revenues the publisher induces the editors to moderate the political message they convey to their readers, so that more readers may buy the newspaper. In this process of convergence the variety of political opinions available to the reader gets reduced.

The same line of reasoning is developed by Strömberg (2004): his political economy model delivers the result that media would find it optimal to give more coverage to topics that interest larger and richer social groups.

By the same token, in the case of European public televisions advertising revenues push the programs toward a growing commercial orientation (Gambaro 2005).

The interaction between advertising and editorial coverage depends both on the structure of the advertising market and on the internal organization of newspapers and advertisers.

There are differences between magazines and daily newspapers. In the former there are typically close links between the advertising department and the newsroom, up to the point that sometimes – and of course unofficially- sales department distribute on a weekly or a monthly basis the list of advertisers that should be covered by journalists. On the other hand, those links are typically milder in newspapers, where heavy advertisers rarely happen to be essential sources of newsworthy stories like in specialized magazines. In our interviews, both advertising executives and journalists assert that direct requests of quid pro quo are relatively rare in newspapers, while they are common in magazines.

In 2007 Italian newspapers collected 1702 million euros of advertising, which represents around half of total revenues. This figure is in line with other European countries, while in the U.S. advertising share is generally 80-85% of the total.

Geographic composition is also different. In Italy only 45% of the advertising is local, while in several north European countries the share is around 60%. The U.S. are on the opposite side of the spectrum, since only 20-25% of the advertising is national.

Our paper contributes to analyze the impact of advertising and public relation on media coverage, with a focus on listed companies. Daily returns and trading volume can be considered as the

revealed opinion of the market about the value of the news that the subsequent day can be published on the newspaper. The sign of the return give also a rough but measurable indication of whether the news environment on a given day about a given company is positive or negative.

We deem newspapers as a suitable environment to test this relation. They are general oriented publication without a specific focus and -since on average they publish 200-250 articles every day- there is enough room for story selection and enough variation among different publications in editorial choices. Instead, in the case of TV and radio, the typical 25-minute long newscast includes 18-20 news, and more than half of them are in some way imposed by the real world and by the agenda setting climate of the media environment.

Moreover, within newspapers the relationship between the editorial and the sales department are weaker than within magazines, on the internet or in the professional press. From this point of view, any significant correlation between advertising and coverage would be particularly significant in a broader perspective.

### **3. Data description**

To perform our empirical analysis, we combine four different types of data.

First, in order to gather data on newspaper coverage, we have run automatic keyword-based searches of electronic archives for an initial sample of 6 newspapers (Corriere della Sera, Repubblica, Stampa, Resto del Carlino, Mattino di Padova and Tirreno) and 13 companies: Campari, Edison, ENEL, ENI, FIAT, Finmeccanica, Geox, Indesit, Luxottica, Mediolanum, Telecom Italia, Tiscali and Tod's. For each (company  $\times$  newspaper) match, we search -on a daily basis- for the total number of articles on that newspaper containing the name of the firm. Since newspapers vary in size both cross-sectionally and in the time series, we proxy for this size by counting the daily number of articles containing the word "il" (the definite article in Italian for masculine nouns). In the empirical analysis we will focus on the daily relative frequency of articles mentioning a given company on a given newspaper, i.e. we will divide the number of articles mentioning that company by the total number of articles featured on that newspaper on that day.

Second, Nielsen kindly provided us monthly data on amount of advertising purchased by each company that is listed on the Italian stock exchange on the main Italian newspapers. Since advertising expenditure refers to brands (and not to companies), we have grouped advertising data for different brands on the basis of the company owning them. The purpose of this reclassification

is to match the advertising data with data on newspaper coverage, press releases and stock returns, which is at the company level. The data covers the period 2006-2007.

Third, for our sample of companies we have searched in an automatic fashion their own archives, in order to obtain information on the exact days when press releases are issued. We thus construct a *press release dummy* which equals one the day after a press release about a given company has been issued, and zero otherwise.

Fourth, we exploit the *Yahoo! Finance* website to collect data on stock quotes and transaction volume for those 13 listed companies. In particular, we use the stock quotes to compute the absolute daily return.

Summary statistics of our variables are shown in Table 1. On average the companies in our sample are mentioned on one-third of a percentage point of the total of daily articles. The distribution of this variable is strongly skewed to the left, as shown by the fact that the *median* number of mentions is zero percent. The distribution of monthly advertising expenditure (expressed in thousands of euros) is similarly skewed, with an average amount of about 25,000 euros and a median amount of zero. At the company level, trading volume is again positively (and strongly) skewed, with an average of around 20 million of euros and a median of 2 million. This is not the case for absolute daily return, which is only slightly skewed.

In order to gauge some sense of the heterogeneity in the data, Table 2 reports descriptive statistics at the company level. The companies issuing the largest number of press releases during the time period are ENI and Telecom, with about 200 each. On the other side of the spectrum, the most parsimonious issuers of press releases are Campari and Mediolanum, with an order of magnitude less (i.e. around 20). Regarding articles mentioning each company, FIAT and ENEL enjoy the lion's share, with about 19,000 and 16,000 articles respectively. On the other hand, Geox is overall featured on about 300 articles, while Campari appears on around 500 articles. FIAT and ENEL are characterised by the highest ratio between articles featuring them and number of press releases issued by them, while Geox and Finmeccanica have the lowest ratio.

For each company we also report the mean relative frequency of articles mentioning that company over the total number of articles being published by each newspaper (column 5). We can also compute this relative frequency conditionally on the presence or the lack of a press release being issued by that company the day before (columns 6 and 7). We can then calculate the percentage change in the relative frequency of articles in press-release vs. non-press-release days (column 8). In a nutshell, the average relative frequency of articles about a company in the lack of a press release is informative about the newsworthiness of that company when the company itself does not produce any additional news. On the other hand, the percentage change in the relative

frequency of articles in the presence of a press release would be indicative of the capacity of each company to create additional media coverage.

With a cursory look at the table one can see that the largest companies in our sample, i.e. Fiat, Enel, Eni and Telecom Italia, do obtain the largest amount of newspaper coverage in the lack of an immediately preceding press release. On the other hand, smaller companies like Campari, Geox and Mediolanum, which start with a low level of coverage in the lack of a press release, enjoy the largest increase in newspaper coverage after the issuance of a press release. Quantitatively speaking, the average change is more than threefold for Campari, and more than twofold for Geox and Mediolanum.

Table 3 displays descriptive statistics at the newspaper level. Overall there are about 57,000 articles mentioning our sampled companies. In relative terms, Stampa is the outlet dedicating more room to companies, while Resto del Carlino and Tirreno dedicate the least. Similarly to what done in Table 2, for each newspaper we compute the relative frequency of articles mentioning one of our sampled companies, respectively in the presence and in the lack of a press release being issued the previous day. We can also calculate the percentage change in coverage when moving from a non-press-release to a press-release day. From this point of view, it turns out that Corriere della Sera and Stampa are the outlets with the largest average increase in coverage after a press release.

#### **4. Results**

As mentioned in the introduction, we are especially interested in the relationship between media coverage of companies and advertising expenditure, controlling for potentially confounding factors. To get a first glance at the correlations in the data, we first compute *monthly* (instead of daily) relative frequencies of stories about a given company on each newspaper: We are thus left with 1872 observations at the (company  $\times$  newspaper  $\times$  month) level. Second, we regress those relative frequencies against a set of fixed effects for each company and each newspaper, plus dummies for those cases where the company owns a significant stake in the newspaper itself. This is true for the match between FIAT and Stampa, and for the one between Corriere and FIAT, Telecom Italia and Tod's. Finally, we compute the residuals of the estimated regression. We do the same (i.e. regress it against a set of fixed effects and obtain residuals) for the total amount of ads being purchased by each company on each newspaper the month before. Figure 1 displays a scatter plot of the coverage residuals against the ads residuals, together with the corresponding linear fit. The relationship is

positive and strongly significant.<sup>2</sup> Controlling for ownership links and time-invariant features of each company and each newspaper, our data suggests that companies buying more ads on a given newspaper obtain significantly more coverage on that newspaper.

In order to delve further into this correlation, we run a set of fixed effects regressions with the relative frequency of articles mentioning company  $c$  on newspaper  $n$  on day  $t$  as the dependent variable. As mentioned in the introduction, we first focus on advertising expenditure and the issuance of press releases by each company. More formally, we run the following type of regression:

$$y_{nct} = \alpha_n + \beta_c + \gamma \cdot ADS_{nc,t-1} + \zeta \cdot pr\_d_{c,t-1} + \phi \cdot ADS_{nc,t-1} \times pr\_d_{c,t-1} + \varepsilon_{nct} \quad (1)$$

where  $y_{nct}$  is the relative frequency of articles mentioning company  $c$  appearing on newspaper  $n$  on day  $t$ ,  $\alpha_n$  and  $\beta_c$  are respectively a newspaper and a company fixed-effect,  $ADS_{nc,t-1}$  is the monetary amount of ads being purchased by company  $c$  on newspaper  $n$  the month before,  $pr\_d_{c,t-1}$  is a dummy which equals one if company  $c$  issued a press release on day  $t-1$ , and  $\varepsilon_{nct}$  is the error term. In order to properly take into account the fact that the error term might be serially correlated within company-newspaper pairs (even after controlling for company and newspaper fixed effects) and hence overestimate the precision of our results, we correspondingly cluster the standard errors at the (company  $\times$  newspaper) level.<sup>3</sup>

Our regression output is displayed in Table 3, whereas we proceed by expanding the set of explanatory variables. Thus in column [1] we simply control for purchased ads, we then add the press release dummy in column [2] and the interaction between this dummy and ads in column [3]. In column [4] we add the two ownership dummies for Corriere and Stampa we have mentioned above.

Across all specifications advertising expenditure is positively and significantly correlated with media coverage. The effect is actually smaller in size when controlling for ownership links (column [4]). In terms of magnitudes, a coefficient of 0.002 in columns [1]-[3] implies that an additional expenditure of 50,000 euros per month by a given company (somewhat less than a standard deviation) is associated with one additional article every one thousand about that company. Since

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<sup>2</sup> Standard errors are clustered at the (company  $\times$  newspaper level), in order to account for within-cluster correlation in the error term.

<sup>3</sup> See Bertrand *et al.* (2004).

on average there are around 13,000 total articles per month, this correlation translates in an increase of about 13 articles per month.

The issuance of a press release is a very significant (and positive) predictor of newspaper coverage, across all specifications. When *not* controlling for the interaction between ads and press releases (i.e. in column [2]), an additional press release is associated with around one and a half additional article mentioning that company every one thousand.

Column [3] shows that the interaction between press releases and advertising is positive and significant at the 5% confidence level. The effect is more strongly significant (and still positive) when controlling for the ownership dummies (column [4]). The magnitude of the conditional effect can be calculated as follows: at the mean level of monthly ads (about 25,000 euros per month) an additional press release is associated with 1.375 additional articles every one thousand ( $0.12 + 0.0007 \times 25$ ). On average, if a firm doubles the amount of advertising, the effect rises to 1.55 additional articles every one thousand. It would jump to around 2 additional articles every one thousand when considering a standard-deviation increase (i.e., around 66,000 euros per month).

The discrepancy in the size and significance of those findings when controlling or not controlling for the ownership dummies is consistent with the fact that companies holding a stake in a given newspaper are not constrained by the issuance of press releases in affecting media coverage about themselves.

In columns [5]-[9] we proxy “residual” real world events pertaining to a company (i.e. those not captured by the issuance of a press release) by controlling for  $|r_{c,t-1}|$ , the absolute daily return of stock  $c$  on day  $t-1$ , by itself and interacted with advertising expenditure.<sup>4</sup> It must be noticed that sample size decreases, since we are only considering days that are immediately preceded by a trading day, i.e. we do not include Sundays and Mondays in the sample.

We find that larger absolute returns are significantly correlated with wider media coverage: in column [5] a coefficient of about 3 implies that a one percentage point increase in the absolute daily return is associated with an increase of 0.03 percentage points in the amount of coverage.

The coefficient on the interaction term between monthly ad expenditure and the absolute stock return would be informative about whether newspaper coverage of a given company differentially reacts to the same stock return as a function of the amount of ads purchased by that company on

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<sup>4</sup> The last columns in Table 2 and 3 respectively report the estimated company and newspaper specific fixed effects, as estimated with the specification adopted in column [6] of Table 4. Those fixed effects provide a measure of the newsworthiness of each company and “news-proneness” of each newspaper after controlling for ads expenditure, press release issuance and stock market behavior.

that newspaper. In column [6] we find that this coefficient is positive and significant at ordinary confidence level. To get a sense of the magnitude of the estimated effect, consider a one standard deviation increase in the amount of ad purchases: the reactivity of newspaper coverage to the absolute stock return would jump from 2.151 to 3.67, i.e. it would increase by more than 70 percent. However, the interaction term is not statistically significant in column [7], i.e. when controlling for the ownership dummies. One should also notice that the significance and magnitude of the ads variable, the press release dummy and the interaction term between the latter is practically unaltered when controlling for past absolute return.

A relevant concern here is that the estimated reactivity of newspaper coverage to the absolute stock return -by itself and interacted with ads purchases- does disguise different correlations in the case of positive vs. negative returns. In columns [8] and [9] we address this issue by separately considering positive and negative returns, properly interacted with lagged ads purchases. In fact, both positive and negative returns are significantly correlated with coverage, and the same is true for the two interaction terms in column [8]. On the other hand, when adding the ownership dummies, only the interaction of ads with *positive* returns is mildly significant at the 10% confidence level. If anything, the estimated reactivity of coverage is larger for positive returns than for negative ones (as shown by the p-value on the corresponding t-test), but one cannot reject at ordinary confidence levels the null hypothesis that the differential reactivity of coverage to stock returns as a function of ads purchases is not significantly different for positive and negative returns.

Up to now, in order to estimate our effects of interest, we have exploited the fact that -for each listed company in our sample and each trading day- we have media coverage data for six different dailies, which differ on the basis of the monetary amount of ads being purchased by that company. In other terms, we have checked whether coverage of a given company, conditionally on the issuance of a press release and the last available absolute return on the stock market, systematically depends on the amount of ads being purchased on the different newspapers. From this point of view, our identification strategy relies on both the time series and the cross-sectional variation across newspapers.

One could also try and explore the *time* variation in the amount of ads being purchased by company  $c$  on newspaper  $n$ , and correlate it again with media coverage. More formally, we modify equation (1) by including fixed effects for each (company-newspaper) pair. This is of course a more demanding specification, since we are controlling for all time-invariant factors that are specific of a given (company-newspaper) pair, and we are solely exploiting the time series variation in newspaper coverage as a function of the time variation in monthly expenditure. Results of this exercise are shown in Table 5, which replicates the format of Table 4, with the sole exception of not

including the specifications with the ownership dummies, as (company  $\times$  newspaper) fixed effects would absorb them.

First, it is interesting to notice that in this setup the partial correlation with monthly ad expenditure is no longer statistically significant, with the sole exception of column [4], i.e. when controlling for lagged absolute return. On the other hand, it is still the case that newspaper coverage of a given company is significantly larger the day after a press release, and that this increase in coverage is systematically larger the more ads are purchased by that company on a given newspaper.

Columns [4]-[5] show that past absolute return is positively and significantly associated with newspaper coverage. Similarly to what found in Table 4, the interaction between the absolute return and ads expenditure is positive and mildly significant when not controlling for the ownership dummies (column [4]), while it is not significant when doing so. In column [6] we again distinguish between positive and negative returns. Both positive and negative returns are significantly correlated with coverage, but only the interaction of ads expenditure with *positive* returns is estimated to be positive and mildly significant at the 10% confidence level, while the one with negative returns is positive but not statistically significant. However, one cannot reject the null hypothesis that the two interaction terms are equal.

## 5. Robustness checks

In Table 6 we present some robustness checks of our results. The table is organized as follows: in columns [1]-[4] we add past day trading volume and its interaction with ads expenditure as explanatory variables. As argued by Barber and Odean (2008), larger than usual trading volume for a given stock is likely to be associated with the arrival of relevant news pertaining to that company. In fact, investors might disagree on how to interpret those pieces of news, so that there is a larger amount of transactions on the stock (see Frazzini and Lamont 2007 for additional references). In columns [1]-[2] we control for company and newspaper fixed effects, while in columns [3]-[4] we control for (company  $\times$  newspaper) fixed effects: for both specifications, we first control for absolute returns and then distinguish between positive and negative returns.

We find that trading volume is a positive and significant predictor of newspaper coverage; moreover, when controlling for time-invariant features of each company-newspaper pair, the interaction between trading volume and ads expenditure is positive and mildly significant. On the other hand, the interaction between returns and ads expenditure is no longer significant at ordinary confidence level. The other results are reasonably robust to this specification, with the only

exception of the positive correlation between newspaper coverage and ads expenditure, which is no longer significant with this more demanding specification. Of course, one should take into account that here we are interacting ads expenditure with the press release dummy, stock returns and trading volume within the same specification, so that approximate multicollinearity might lower the estimated precision of individual coefficients.

In columns [5]-[8] we replace last month's ads expenditure with the contemporaneous value thereof, again interacted with the press release dummy and previous day absolute return. Endogeneity concerns clearly induce us to prefer the baseline specification -with previous month's advertising expenditure as explanatory variable-, but one could argue that newspaper coverage more immediately reacts to contemporaneous expenditure. We replicate the set of specifications being used in columns [1]-[4], and we similarly find that advertising expenditure is no longer a significant predictor of newspaper coverage, even when not controlling for (company  $\times$  newspaper) fixed effects. Compared to the baseline results shown in Table 4 and 5, the interaction between ads expenditure and the press release dummy is still positive and significant, but at a lower confidence level; on the other hand, the interactions between (absolute and positive) returns and ads expenditure do reach higher levels of statistical significance here.

Finally, in columns [9]-[12] we control for the sum of ads expenditure during the last three months, again properly interacted with our variables of interest. The purpose of this exercise is to check whether the cumulative amount of ads being purchased by a given company on a given newspaper is a less noisy signal than previous month's expenditure. The sign and statistical significance of ads expenditure, the press release dummy and their interaction is comparable to what found with the baseline specification. Interestingly, while the interaction of ads expenditure with neither positive nor negative returns is significantly different from zero at ordinary confidence levels, here one can reject the null hypothesis that those interactions are equal, i.e. the interaction with positive returns appears to be significantly larger than the one with negative returns.

## 6. Conclusions

In this paper we have investigated how –in a sample of Italian newspapers- coverage of listed companies is correlated with advertising. More specifically, we find that the amount of advertising a given company purchases on a given newspaper is positively and significantly associated with the number of articles mentioning that company. This result is robust to controlling for time-invariant features of newspapers and companies.

We have also matched coverage and advertising data with data on the exact days when companies issue their press releases. Unsurprisingly, newspaper coverage of a given company is significantly larger the day after a press release. But it is also the case that this increase in coverage is significantly larger on newspapers where that company has purchased more ads. This result is statistically stronger when controlling for ownership links between companies and newspapers, and when generally controlling for (company  $\times$  newspaper) fixed effects.

We use the previous day absolute return of the company's stock as a proxy for the presence of company-specific newsworthy events, which are not fully captured by the issuance of press releases, and find some evidence that positive returns obtain systematically more attention on those newspapers that receive more advertising from the company in question.

From this point of view, strategic actions by firms -in the shape of ads purchases- appear to influence the amount of information regarding them that is provided by actors like newspapers, which in principle should not behave as agents for a principal other than their readers.

In the future we plan to check whether this pattern of results is robust to extending our sample of companies and newspapers. From a broader perspective, one can replicate the analysis performed here in other country settings. *Ex ante*, in the case of daily newspapers, it would be interesting to check whether the correlations we have found are typical of countries where national level advertising is widespread, while they are less strong in countries like the U.S., where local advertising is comparatively more relevant.

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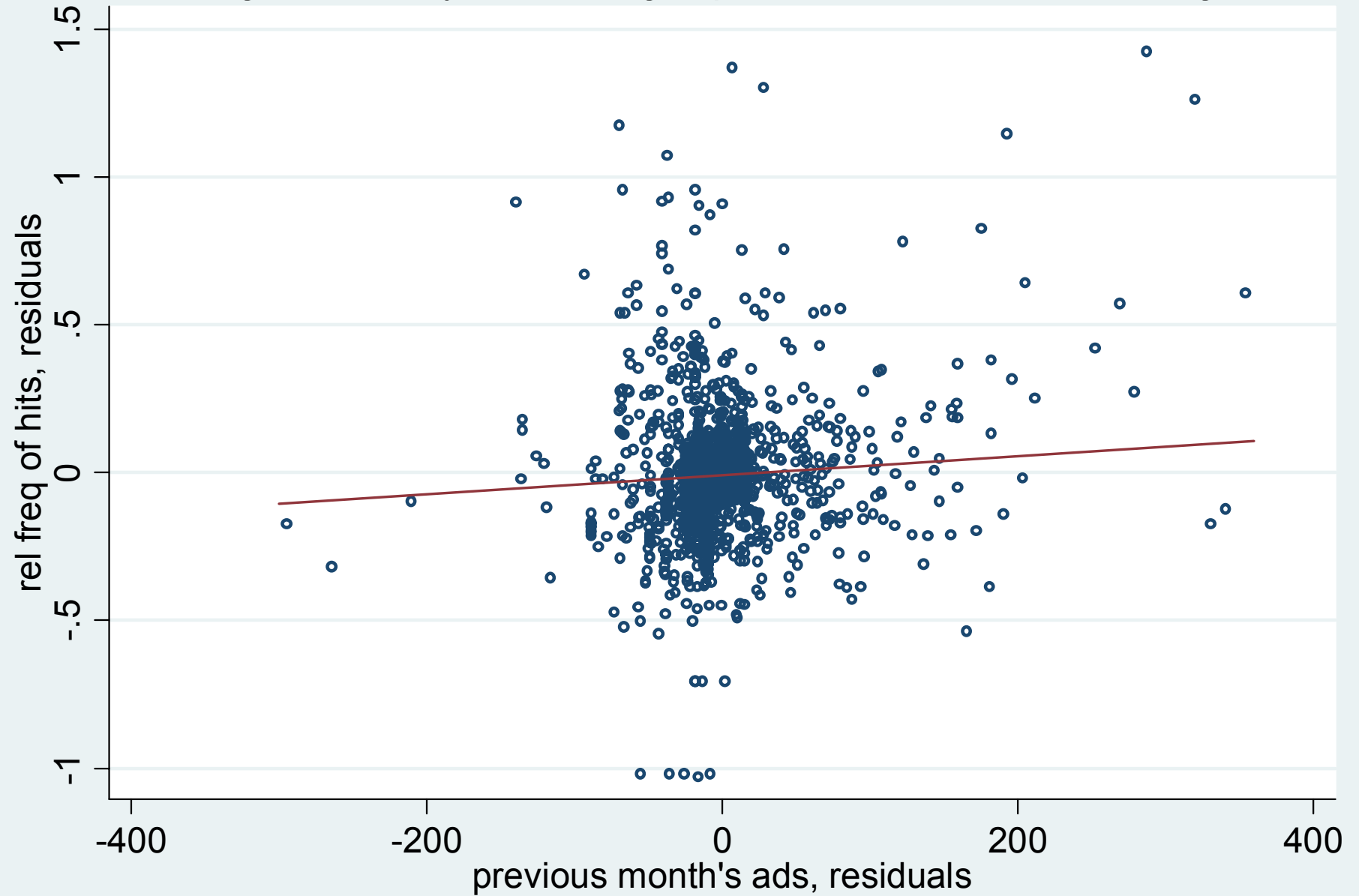
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Fig. 1: monthly advertising expenditure and media coverage



**Table 1: summary statistics**

<b>Variable</b>	<b>No of obs.</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<i>Newspaper x company level variables</i>						
relative frequency of articles on newspaper n mentioning company c (%)	53704	0.306	0	0.644	0	18.54839
monthly advertising expenditure, thousands of euros	1872	24.962	0	66.614	0	695
<i>Company level variables</i>						
daily absolute return	6440	0.012	0.0087	0.011	0	0.11
daily trading volume, million of euros	6440	20.388	2.1392	47.926	0	980

Notes: the relative frequency of articles on newspaper n about company c is calculated by dividing the daily count of articles mentioning company c on newspaper n by the daily number of articles where the word "il" (Italian definite article for masculine nouns) appears. This relative frequency is expressed in percentage points.

Sources: article counts come from keyword-based searches of online news archives. Ad data is from Nielsen, while financial data is taken from the Yahoo! Finance website.

**Table 2: company level data, 2006-2007**

<b>COMPANY</b>	<b>number of press releases</b>	<b>number of articles</b>	<b>articles/(press releases)</b>	<b>relative frequency of articles (%)</b>	<b>rf of articles in days after a press release (%)</b>	<b>rf of articles in days with no press release (%)</b>	<b>change in relative frequency after a press release (%)</b>	<b>company-specific fixed effect</b>
campari	22	483	21.95455	0.0332602	0.1364054	0.0299354	355.6655	-1.078235
edison	42	2062	49.09524	0.153081	0.2329925	0.148021	57.40505	-0.9563448
enel	191	15799	82.71728	0.8345444	1.004815	0.7725204	30.06974	-0.3342947
eni	137	5855	42.73722	0.4961684	0.6519045	0.4587076	42.11765	-0.6415821
fiat	77	19142	248.5974	1.438025	1.705552	1.405972	21.30775	0
finmeccanica	112	1687	15.0625	0.1379814	0.2359285	0.1196251	97.2233	-0.9669719
geox	39	332	8.51282	0.0292919	0.0816129	0.0261929	211.5838	-1.091043
indesit	54	961	17.7963	0.0478967	0.0991368	0.0436838	126.9421	-1.075854
luxottica	49	818	16.69388	0.0755	0.1405838	0.0707135	98.80761	-1.032097
mediolanum	23	1513	65.78261	0.1135935	0.3477527	0.106106	227.7408	-1.004995
telecom italia	204	5350	26.22549	0.4171141	0.4895966	0.3883614	26.06728	-0.9490457
tiscali	47	2208	46.97872	0.1506723	0.2834693	0.1412384	100.7027	-0.8322881
tods	28	691	24.67857	0.0551606	0.137754	0.0517028	166.4345	-1.08209

Notes: for each company we report the total number of press releases being issued during the time period (column 2), the total number of articles being published on our sample of newspapers (column 3), the ratio between articles and press releases (column 4), the mean relative frequency of articles over the total (column 5), the relative frequency of articles conditional on a press release being issued the day before (column 6), the relative frequency of articles in the lack of a press release the previous day (column 7), the percentage change in the relative frequency of articles in press-release vs. non-press-release days (column 8). Finally in column 9 we report the estimated company-specific fixed effect, as obtained from a regression with the relative frequency of articles mentioning company c on newspaper n, controlling for newspaper fixed effects, previous month's ads, a press-release dummy, the absolute return on the stock market the day before, and the interactions of those latter variables with monthly ads expenditure. See the text for additional details.

**Table 3: newspaper level data, 2006-2007**

<b>NEWSPAPER</b>	<b>number of articles on sampled companies</b>	<b>total number of articles</b>	<b>freq of articles on companies (%)</b>	<b>freq of articles on companies the day after a press release (%)</b>	<b>freq of articles on companies in the lack of a press release (%)</b>	<b>change in relative frequency after a press release (%)</b>	<b>newspaper fixed effect</b>
Corriere della Sera	7848	161137	4.87039	0.7676254	0.3159567	142.9527	1.100256
Repubblica	12261	335335	3.656344	0.4553166	0.2611352	74.36046	1.037812
Stampa	6627	91414	7.249437	1.11424	0.4948258	125.1783	1.29685
Resto del Carlino	12726	502509	2.532492	0.3569597	0.1852831	92.65638	0.9895052
Mattino di Padova	3770	127821	2.949437	0.3869579	0.2060711	87.77877	1.028056
Tirreno	13669	540162	2.530537	0.3485993	0.1624168	114.6326	0.9925553

Notes: for each newspaper we report the total number of articles mentioning our sample of companies (column 2), the total number of articles being published during the time period (column 3), the mean relative frequency of articles mentioning those companies over the total (column 4), the relative frequency of articles mentioning a company, conditional on a press release being issued the day before (column 5), the relative frequency of articles in the lack of a press release the previous day (column 6), the percentage change in the relative frequency of articles in press-release vs. non-press-release days (column 7). Finally in column 8 we report the estimated newspaper-specific fixed effect, as obtained from a regression with the relative frequency of articles mentioning company c on newspaper n as dependent variable, controlling for company fixed effects, previous month's ads, a press-release dummy, the absolute return on the stock market the day before, and the interactions of those latter variables with monthly ads expenditure. See the text for additional details.

**Table 4: daily coverage of listed companies, company and newspaper fixed effects**

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
advertising expenditure, previous month	0.002***	0.002***	0.002***	0.0005*	0.002***	0.002***	0.001**	0.002***	0.001**
	[3.59]	[3.58]	[3.35]	[1.85]	[4.04]	[2.84]	[2.12]	[2.84]	[2.11]
press release dummy	-	0.147***	0.129***	0.120***	-	0.107***	0.099***	0.107***	0.099***
		[6.48]	[6.13]	[6.11]		[5.99]	[5.85]	[5.97]	[5.82]
advertising expenditure x press release dummy	-	-	0.0005**	0.0007***	-	0.001**	0.001***	0.001**	0.001***
			[2.00]	[3.64]		[2.14]	[3.24]	[2.13]	[3.21]
dummy for owner's coverage on Corriere	-	-	-	0.061	-	-	0.076	-	0.076
				[0.76]			[0.86]		[0.86]
dummy for owners' coverage on Stampa	-	-	-	1.360***	-	-	1.240***	-	1.241***
				[9.63]			[8.74]		[8.75]
absolute stock return, previous day	-	-	-	-	3.113***	2.151***	2.417***	-	-
					[6.43]	[4.86]	[5.17]		
advertising expenditure x absolute return	-	-	-	-	-	0.023**	0.015	-	-
						[2.49]	[1.47]		
positive absolute return, previous day	-	-	-	-	-	-	-	2.359***	2.626***
								[4.75]	[5.11]
advertising expenditure x positive absolute return	-	-	-	-	-	-	-	0.023**	0.017*
								[2.48]	[1.67]
negative absolute return, previous day	-	-	-	-	-	-	-	1.896***	2.169***
								[4.46]	[4.70]
advertising expenditure x negative absolute return	-	-	-	-	-	-	-	0.022**	0.013
								[2.41]	[1.15]
test of equal slopes for positive and negative returns: p-value	-	-	-	-	-	-	-	0.12	0.13
test of equal slope for interactions of ads with positive and negative returns: p-value	-	-	-	-	-	-	-	0.67	0.28
R squared	0.45	0.46	0.46	0.49	0.45	0.45	0.48	0.45	0.48
Number of companies	13	13	13	13	13	13	13	13	13
Number of newspapers	6	6	6	6	6	6	6	6	6
Observations	53704	53704	53704	53704	37911	37911	37911	37911	37911
newspaper fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
company fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
newspaper x company fixed effects	no	no	no	no	no	no	no	no	no

Notes: the table displays the output of OLS regressions with the relative frequency of articles on newspaper *n* mentioning company *c* as dependent variable. Company-specific and newspaper-specific fixed effects are included in each specification. Monthly ad expenditure refers to the previous month. The dummy for owner's coverage on Stampa equals one for the coverage of FIAT on Stampa. The dummy for owners' coverage on Corriere equals one for coverage of Fiat, Telecom Italia and Tod's on Corriere. Standard errors are clustered at the (company x newspaper) level, and the corresponding t-statistics are reported in brackets below each coefficient. Significant at 1%; \*\* significant at 5%; \*\*\* significant at 1%. In columns [8] and [9] we separately consider positive and negative returns, properly interacted with the ad expenditure variable, and report the p-values of the tests for equal slopes and for equal interaction terms.

**Table 5: daily coverage of listed companies, (company x newspaper) fixed effects**

	[1]	[2]	[3]	[4]	[5]	[6]
advertising expenditure, previous month	0	0	0	0.0003*	0	0
	[1.15]	[1.03]	[0.18]	[1.74]	[0.32]	[0.34]
press release dummy	-	0.150***	0.121***	-	0.099***	0.099***
		[6.41]	[6.12]		[5.96]	[5.94]
advertising expenditure x press release dummy	-	-	0.001***	-	0.001***	0.001***
			[4.12]		[3.19]	[3.16]
absolute stock return, previous day	-	-	-	3.176***	2.460***	-
				[6.57]	[5.39]	
advertising expenditure x absolute return	-	-	-	-	0.014	-
					[1.50]	
positive absolute return, previous day	-	-	-	-	-	2.677***
						[5.35]
advertising expenditure x positive absolute return	-	-	-	-	-	0.016*
						[1.76]
negative absolute return, previous day	-	-	-	-	-	2.204***
						[4.84]
advertising expenditure x negative absolute return	-	-	-	-	-	0.012
						[1.10]
test of equal slopes for positive and negative returns: p-value	-	-	-	-	-	0.12
test of equal slope for interactions of ads with positive and negative returns: p-value	-	-	-	-	-	0.27
R squared	0.52	0.53	0.53	0.52	0.52	0.52
Number of companies	13	13	13	13	13	13
Number of newspapers	6	6	6	6	6	6
Observations	53704	53704	53704	37911	37911	37911
newspaper fixed effects	yes	yes	yes	yes	yes	yes
company fixed effects	yes	yes	yes	yes	yes	yes
newspaper x company fixed effects	yes	yes	yes	yes	yes	yes

*Notes:* the table displays the output of OLS regressions with the relative frequency of articles on newspaper n mentioning company c as dependent variable. (Company x newspaper)-specific fixed effects are included in each specification. Monthly ad expenditure refers to the previous month. Standard errors are clustered at the (company x newspaper) level, and the corresponding t-statistics are reported in brackets below each coefficient. Significant at 1%; \*\* significant at 5%; \*\*\* significant at 1%. In column [6] we separately consider positive and negative returns, properly interacted with the ad expenditure variable, and report the p-values of the tests for equal slopes and for equal interaction terms.

**Table 6: robustness checks**

	trading volume				current month's ads				three-month sum of ads			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
advertising expenditure	0	0	0	0	0	0	0	0	0.0003*	0.0003*	0	0
	[1.31]	[1.30]	[1.00]	[1.00]	[1.30]	[1.30]	[0.73]	[0.73]	[1.92]	[1.90]	[1.38]	[1.44]
press release dummy	0.099***	0.099***	0.099***	0.099***	0.099***	0.099***	0.102***	0.101***	0.089***	0.088***	0.089***	0.089***
	[5.93]	[5.91]	[5.95]	[5.93]	[5.29]	[5.26]	[5.54]	[5.51]	[4.97]	[4.92]	[5.16]	[5.11]
advertising expenditure x press release dummy	0.001***	0.001***	0.0008*	0.0008*	0.001*	0.001*	0.001*	0.001*	0.0004***	0.0004***	0.0004***	0.0004***
	[2.97]	[2.87]	[1.88]	[1.86]	[1.91]	[1.88]	[1.83]	[1.80]	[4.31]	[4.25]	[4.49]	[4.37]
dummy for owner's coverage on Corriere	0.081	0.081	-	-	0.085	0.085	-	-	0.049	0.05	-	-
	[0.90]	[0.90]			[0.93]	[0.93]			[0.57]	[0.58]		
dummy for owners' coverage on Stampa	1.302***	1.302***	-	-	1.273***	1.272***	-	-	1.141***	1.142***	-	-
	[8.62]	[8.63]			[8.78]	[8.77]			[6.82]	[6.79]		
absolute stock return, previous day	2.196***	-	2.228***	-	2.430***	-	2.448***	-	2.609***	-	2.699***	-
	[4.76]		[5.03]		[5.26]		[5.50]		[4.97]		[5.36]	
advertising expenditure x absolute return	0.007	-	0.005	-	0.019*	-	0.017**	-	0.003	-	0.003	-
	[0.79]		[0.75]		[1.87]		[2.29]		[0.71]		[0.66]	
positive absolute return, previous day	-	2.401***	-	2.442***	-	2.648***	-	2.676***	-	2.794***	-	2.873***
		[4.68]		[4.94]		[5.12]		[5.34]		[4.96]		[5.33]
advertising expenditure x positive absolute return	-	0.007	-	0.005	-	0.021**	-	0.019***	-	0.004	-	0.004
		[0.79]		[0.73]		[2.17]		[2.84]		[1.02]		[1.06]
negative absolute return, previous day	-	1.941***	-	1.962***	-	2.166***	-	2.169***	-	2.389***	-	2.496***
		[4.27]		[4.47]		[4.70]		[4.91]		[4.48]		[4.80]
advertising expenditure x negative absolute return	-	0.007	-	0.005	-	0.016	-	0.015	-	0.001	-	0.001
		[0.70]		[0.60]		[1.40]		[1.54]		[0.31]		[0.18]
trading volume, previous day	0.001**	0.001**	0.001***	0.001***	-	-	-	-	-	-	-	-
	[2.27]	[2.27]	[2.72]	[2.72]								
advertising expenditure x trading volume	0	0	0.000*	0.000*	-	-	-	-	-	-	-	-
	[1.49]	[1.49]	[1.88]	[1.86]								
test of equal slopes for positive and negative returns: p-value	-	0.15	-	0.14	-	0.17	-	0.14	-	0.21	-	0.25
test of equal slope for interactions of ads with positive and negative returns: p-value	-	0.99	-	0.98	-	0.32	-	0.47	-	0.04	-	0.02
R squared	0.48	0.48	0.53	0.53	0.48	0.48	0.52	0.52	0.48	0.48	0.52	0.52
Number of companies	13	13	13	13	13	13	13	13	13	13	13	13
Number of newspapers	6	6	6	6	6	6	6	6	6	6	6	6
Observations	37911	37911	37911	37911	37911	37911	37911	37911	37911	37911	37911	37911
newspaper fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
company fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
newspaper x company fixed effects	no	no	yes	yes	no	no	yes	yes	no	no	yes	yes

Notes: the table displays the output of regressions with the relative frequency of articles on newspaper n mentioning company c as dependent variable. Company and newspaper fixed effects are included in columns [1]-[2], [5]-[6] and [9]-[10]. In columns [3]-[4], [7]-[8] and [11]-[12] (company x newspaper) fixed effects are included as well. In columns [1]-[4] we add trading volume as a regressor, together with its interaction with past month's ads expenditure. In columns [5]-[8] we control for the contemporaneous level of ads, while in columns [9]-[12] we control for the sum of ads expenditure during the past three months. Standard errors are clustered at the (company x newspaper) level, and the corresponding t-statistics are reported in brackets below each coefficient. Significant at 1%; \*\* significant at 5%; \*\*\* significant at 1%. See previous tables for notes regarding specific variables.