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What do ads buy? Daily coverage of listed companies on the Italian press

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ABSTRACT

We match daily data on newspaper coverage of a sample of Italian listed companies with monthly data on the amount of advertising that a given company has purchased on a given newspaper. Controlling for time-invariant features of each newspaper and of each company – and for ownership links between companies and newspapers – we show that newspaper coverage of a company is positively and significantly related with advertising expenditure by that company on that newspaper. The magnitude of this correlation is quite large: when controlling for ownership links, a standard deviation increase in monthly ads expenditure (i.e. 75,000 euros) is on average associated with 8 additional articles per month mentioning that company. We also find that coverage of a company is higher the day after a press release, but especially in newspapers where more ads are purchased. This result on press releases is robust to controlling for time invariant features of each company–newspaper pair, i.e. for (company × 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, especially in the case of *positive* returns.

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1. Introduction

The media is the primary example of a two-sided market, whereas readers and viewers are sold valuable informative or entertainment content, while advertisers buy the attention of the former. However, advertisers could be interested not only in buying space on media outlets, but also in influencing what is featured in the "news hole", i.e. the space where news and editorial content appears (Ellman and Germano, 2009). This is the case, since consumers might be less receptive to ads if there are negative news or comments on advertised products. In fact, 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, as it decreases the probability of capture by the incumbent government (Besley and Prat, 2006) and/or by political parties (Gentzkow et al., 2006).[1]

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[1] Advertising can influence the editorial line of a newspaper also in more indirect and general way. Gabszewicz et al. (2001) propose a model where -in order to get larger advertising revenues- the publisher induces the editors to moderate the political message conveyed to readers, so that more readers may buy the newspaper. As a consequence of this process of convergence the variety of political opinions available to the reader shrinks. Strömberg (2004) follows a similar line of reasoning: according to his political economy model, media outlets find it optimal to give more coverage to topics that are of interest to larger and richer social groups. By the same token, in the case of European public television advertising revenues appear to push broadcasted content towards a growing commercial orientation (Gambaro, 2005).

The regulatory and the liberal view of the media are not mutually exclusive, since advertising might entail social costs and social benefits at the same time. Thus, the most ambitious empirical goal would be to provide an overall assessment of these costs and benefits, but this is hardly feasible. Here we focus on a narrower question, which relates to the cost side of the issue: to what extent can companies influence media coverage through advertising? If ads have an influence on the news provided by the mass media, readers and viewers face a tougher signal extraction problem when they rely on them for information purposes.

In this paper we provide some answers to this question by investigating the link between advertising and media coverage by daily newspapers. The reason for this choice is twofold. First, in the case of daily newspapers any significant correlation between advertising and coverage is more likely to be driven by advertiser influence, as compared to the case of –say- magazines. Newspapers are typically general-interest outlets, which differ from each other according to the ideological stance and/or the geography of readers, but not on the basis of their tastes within the product space. On the other hand magazines are predominantly specialized in a given topic, and thus more prone to segment the market according to those product tastes. To the extent that readers of magazines are interested in both ads and articles about the specific products on which each of those magazines focuses on, any found correlation between ads and articles might be simply demand-driven. This is less likely to happen in the case of newspapers.[2] Second, the journalistic standards on the objectivity of coverage and the independence of the newsroom from the advertising department are generally stricter for newspapers than for magazines, so that it should be ex ante less likely to find evidence of advertiser bias in the former than in the latter.

More specifically, we investigate the daily amount of coverage devoted by 6 newspapers to a sample of 13 Italian listed companies during the period 2006–2007, as a function of the monthly advertising expenditure by each company on each newspaper. 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. The size of this correlation is quite large: when controlling for ownership links between newspapers and companies, an additional expenditure of 75,000 euros per month by a given company (i.e. a standard deviation increase) on a given newspaper is on average associated with an increase of about 8 articles per month that mention that company.

Companies themselves – through their public relations (PR) departments – are a primary source of information for the media and the public about anything newsworthy happening to them: even if we do not observe the informal relationships between PR officers and journalists, we have information on the exact date when sampled companies issue their official press releases. Not surprisingly, the coverage of a given company is much larger the day after a press release. But we find this increase in coverage to be systematically larger on newspapers where that company has purchased more ads the month before. This result is robust to a more demanding empirical specification, where we control for time-invariant characteristics of each company–newspaper pair, i.e. we solely exploit the *time* variation in media coverage, advertising expenditure and press release issuance.

Since press releases would only partially capture the flow of newsworthy events about the sampled companies, we add as a control the absolute value of the daily return of company stocks during the previous trading day. This variable should work as a high-frequency proxy for the presence of newsworthy events (Barber and Odean, 2008). Also, large movements in stock prices are newsworthy *by themselves*, irrespective of the presence of other newsworthy events that might have caused them. Moreover, the sign of the return should give a rough -but measurable- indication of whether the news environment on a given day about a given company is positive or negative.

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 steeper the larger the amount of advertising expenditure 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. 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.

We also explore to what extent our results are robust to focusing on theoretically relevant subsamples of the original data, i.e. national vs. regional newspapers, and state-owned firms.

To our knowledge, there is little empirical evidence on advertisers' influence on media coverage, with some important exceptions. 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*. Second, a recent paper by Di Tella and Franceschelli (2011) shows that there is a negative and sizeable correlation between the amount of ads purchased by the Argentinean government on daily newspapers and front page coverage of corruption scandals involving members of the incumbent government.

Rinallo and Basuroy (2009) investigate the link between advertising and media coverage on fashion magazines in a multi-country setting. They find that advertisers receive a preferential treatment in coverage, especially when publisher revenues are concentrated in a few industries. Moreover, large companies enjoy a comparative advantage in obtaining coverage.[3]

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[2] Of course, this is just a *relative* statement, in the sense that demographic factors are less likely to segment demand for daily newspapers, but this does not imply that those factors are entirely absent.

[3] Gurun and Butler (2012) 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. They offer some evidence that this slant is linked with local advertising expenditure.

There are similarities and differences between those papers and ours. Similarly to Rinallo and Basuroy we are interested in the *total amount of coverage* devoted by media outlets to companies advertising on them, while Reuter and Zitzewitz focus on the *tone of coverage*, in the shape of mutual fund recommendations. Di Tella and Franceschelli investigate the amount of coverage devoted to corruption scandals, but in their case it is easier to argue that the tone of coverage is likely to be negative. Methodologically, our approach is closest the one followed by Di Tella and Franceschelli, since we do include fixed effects to control for invariant features of each newspaper and each newsworthy object, i.e. a company in our case and a corruption scandal in theirs.[4] On the other hand, Reuter and Zitzewitz control for observable fund characteristics, but not for fund fixed effects.[5]

The closest paper to our own is the empirical analysis of advertiser bias on the Belgian press by De Smet and Vanormelingen (2012). They analyze the relationship between advertising and coverage of 57 companies on 8 newspapers during the period 2001–2005. Controlling for (company × newspaper) fixed effects, they find a positive and significant correlation between advertising and coverage.

Thus, we share with them the focus on daily newspapers, but we differ in the frequency of the data, since we analyze the *daily* variation in coverage –and thus control for press releases and for a stock-market based measure of newsworthiness – while they directly look at the monthly variation. It must be noted that their sample of companies is larger than our own (57 companies instead of 13), and – as mentioned above, their results on the positive correlation between coverage and advertising are robust to controlling for time-invariant feature of each company–newspaper pair. However, the standard errors in their estimates are not very conservative, since they are not clustered at the (company × newspaper) level (Bertrand et al., 2004).

Our results are also related to the literature on the links between media coverage and financial markets. Barber and Odean (2008) show that individual investors are net buyers of stocks in the news, irrespective of the tone of coverage. If this is the case, our results point to an interesting synergy between the marketing and the investor relation departments of 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 regarding that company, which can induce readers as investors to buy its shares. In equilibrium, this in turn could translate in higher stock prices, i.e. a lower cost of capital for the firm (Fang and Peress, 2009).[6] To the extent that there are systematic variations in the influence of the advertising activity across companies and sectors, the cost of capital could correspondingly be more heterogeneous.

The paper is organized as follows. In Section 2 we provide some background on the interactions between companies and media organizations, with some specific focus on the Italian case. 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 6 concludes.

2. The relationship between companies and media outlets

Companies are interested in providing information to potential and actual customers through the mass media. They can do so by directly purchasing advertising space and/or by engaging in public relation activities, in order to influence coverage. In fact, companies value editorial space because (i) the news selection process carried by the editorial team can attribute a higher degree of credibility to the information contained in an article, as compared to what can be obtained only through the means of advertising and (ii) media relation activity is typically cheaper than advertising space.[7]

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. In the lack of systematic evidence on this, we conducted some interviews with Italian journalists[8], working for both newspapers and magazines: they declare to receive on average between 20 and 40 press releases per day, from which they pick up 1–2 news/articles.[9] Since the same press release is sent

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[4] In fact, by distinguishing scandals according to the identity of the ruling president, Di Tella and Franceschelli can similarly include fixed effects for each (newspaper × president) pair.

[5] Vis a vis advertiser-led media bias, the literature on *political* media bias is comparatively much ampler (see among others Groseclose and Milyo, 2005; Gentzkow and Shapiro, 2010; Larcinese et al., 2011; Durante and Knight, 2012; Puglisi and Snyder, 2015). Interestingly, this literature is not only focused on the determinants of bias but also on its persuasion effects (DellaVigna and Kaplan, 2007; Knight and Chiang, 2011; Aboura, 2005); see (DellaVigna and Gentzkow, 2010 for a survey). Friebel and Heinz (2014) find evidence of both qualitative and quantitative media slant against foreign firms in German newspapers. Within the expanding literature on the effects of decisions and announcements by central banks, there is also some work on how the media cover them. See e.g. Böhm et al. (2012) on the case of the Czech National Bank during the period 2002–2007.

[6] 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. Using a large dataset on merger negotiations and media coverage, Ahern and Sosyura (2014) find that firms involved in a stock merger disseminate substantially more news stories that generate a short lived run-up of bidders' stock price. Bignon and Miscio (2010) investigate the coverage of listed companies on the French press during the first decades of the 19th century.

[7] 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 space and position. Editorial space might still be costly, to the extent that it is obtained by purchasing additional advertising space and/or by investing more time and money in press releases that are sufficiently attractive to journalists. However, several interviews with public relation practitioners and advertising executives confirmed to us that the costs associated to influencing editorial coverage are usually lower than the direct costs of advertising space.

[8] To assess the stylized facts about the work of journalists, the process of news selection and the relationship between journalists and public relation officers, we carried out 12 semi-structured personal interviews. More precisely, we interviewed 2 deputy directors of large newspapers, 3 senior economic editors in major newspapers, one senior editor in a newsmagazine, 2 economic journalists in newspapers, 2 PR managers in large listed companies, and 2 media relation officers working in PR agencies. We also discussed our preliminary results in two separate workshops, one with 8 senior journalists and the other with 9 public relation officers both from companies and from independent agencies.

[9] In the empirical analysis that follows we rely on press releases as an observable proxy for the PR activities that companies routinely perform. Of course, the bulk of those activities revolves around the ongoing relationships between PR officers and journalists/editors, but there is no straightforward way to measure those, unless PR officers and/or journalists accept to disclose this information. We thank an anonymous referee for raising this measurement issue.

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.[10]

But this dissemination activity is important for media companies as well, because 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 covered topics and the growth in the number of pages, this share has been steadily growing over the last twenty years (Gambaro, 2007).[11] Media outlets are active on a two-sided market, whereas readers and viewers demand entertainment and/or information, while advertisers pay for the attention of the former. Within an asymmetric information environment, readers and viewers cannot perfectly observe the actions of media outlets in the intermediate market of potential stories, which is fed by news agencies and press releases. This is the market where the newspaper on a daily basis would pick up stories 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, and possibly to other stakeholders.[12] A certain amount of effort and costs would on average translate into 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 utility to the reader.

When the potential piece of news is related with a company or its products, a story-specific investment in disclosure and dissemination by the company itself (press releases, photos, contacts) can lower the cost for the newspaper to produce that news, and therefore increase its probability of being ultimately published. This is in some sense a gray 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): both the newsworthiness and the accurateness of a story are 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, since a company has no reason to engage in a costly activity if the news regarding it is published anyway.[13] While there are several qualitative and anecdotal papers on the relationship between PR officials and journalists, and its effects on media output, only recently have more rigorous and quantitative studies emerged, mainly regarding the financial sector.[14]

Within the strategic 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). Other things being equal, this leverage is more powerful when advertising revenue per copy is larger, advertising companies are more concentrated, and when the publication is weaker.[15] When there is an exchange between advertising and coverage, a newspaper is likely to lose copies but the increase in advertising revenue can more than compensate this loss (Di Tella and Franceschelli, 2011).[16]

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. As mentioned in the introduction, 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. These links are typically milder in newspapers, where heavy advertisers rarely happen to be essential sources of newsworthy stories like in specialized magazines.

In 2007 Italian newspapers collected 1702 million euros of advertising, which represents around half of total revenues.[17] Geographic composition is also different. In Italy only 45% of newspaper advertising is local, while in several north European countries the share is around 60%.[18]

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[10] In specialized magazines, where the matching between company disclosure and editorial interest is easier, the publication rate is higher, usually around one article every 3 or 4 press releases.

[11] According to UPA, the union-like organization of Italian companies that advertise (http://www.upa.it/eng/about-upa/ourprofile/index.html), in 2007 those 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. On the other hand PR officers, both internal and outsourced, are estimated in the range between 20,000 and 50,000, and they confront around 10,000 press journalists (2007 figure).

[12] See Mullainathan and Shleifer (2005) and Gentzkow and Shapiro (2006) for demand-driven models of ideologically slanted media coverage. For supply-led models of slanted coverage see Baron (2006) and Gentzkow et al. (2006).

[13] Of course, there are also circumstances under which the company tries to soften or to erase a bad news. This is more likely 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 future years and trade it off against the intensity of slant which is required on that particular occasion.

[14] Dyck and Zingales (2003) lay out a quid pro quo theory of the relationship between companies and journalists, with some evidence consistent with it: journalists are more likely to give coverage to the type of earnings that companies emphasize in their press releases (GAAP or "pro forma" earnings) and controlling for the size of the earnings surprise — stock prices react more strongly to the type of earnings emphasized by the press. Differently from Dyck and Zingales, we look at the amount rather than the type of coverage, but we match it with data on advertising expenditure. Bushee and Miller (2012) 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. Choi and Park (2011) focus on mobile phone companies and find that newspapers publish more articles derived from press releases if companies buy more advertising; they also show that the bias is stronger for local than for national newspapers. De Smet and Vanormelingen (2011) conduct a survey among Belgian newspaper journalists and find that 35 of them experienced some pressure from advertisers. Depken and Wilson (2004) investigate empirically whether advertising positively or negatively affects magazine subscriptions.

[15] See the evidence in Reuter and Zitzewitz (2006) and Rinallo and Basuroy (2009).

[16] On the company side, private incentives of top managers can also 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, 2015).

[17] This figure is in line with other European countries, while in the U.S. advertising share is generally 80–85% of the total.

[18] The U.S. are located 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. 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 real world events and by the agenda setting climate of the media environment.

3. Data description

To perform our empirical analysis, we combine four different types of data. First, in order to gather data on newspaper coverage of companies, we have run automatic keyword-based searches of electronic archives for a sample of 6 newspapers (Corriere della Sera, Repubblica, Stampa, Resto del Carlino, Mattino di Padova and Tirreno) and 13 listed companies: Campari, Edison, ENEL, ENI, FIAT, Finmeccanica, Geox, Indesit, Luxottica, Mediolanum, Telecom Italia, Tiscali and Tod's. Regarding newspapers, following Reuter and Zitzewitz (2006) we chose the three main national ones (Corriere della Sera, Repubblica and Stampa) and three regional ones (Resto del Carlino, Mattino di Padova and Tirreno).[19] We excluded political newspapers, which happen to be heavily subsidized.[20] Also, our final choice of newspapers was bounded by the availability of online news archives. Finally, it must be noted that both subsamples – i.e., national and regional newspapers – are geographically balanced. On the other hand, we randomly selected medium–large companies within a subset that satisfies the following conditions: (i) they are not media companies or banks;[21] (ii) they must have spent at least 200,000 euros in newspaper ads during the time period. The resulting sample included 6 companies with over 10 billion euros of market capitalization, and 7 companies below that threshold. Those companies represent 20% of total market capitalization in the Milan Stock Exchange (32% of total capitalization, if we focus only on the sectors we include in the initial population). The sample includes three clothing companies, three public utilities, one appliance, one petrol company, one automotive, one internet provider, one beverage, one insurance company and one electronic. Most of the companies operate in consumer markets, but some of them are active in the business to business segments, and thus display a significant share of institutional advertising.[22] On the whole we have 7 industrial and 6 service companies. For each (company × 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).[23] 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 with monthly data on the 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 hundreds of thousands of euros) is similarly skewed, with an average amount of about 25,000 euros and a median amount of zero. At the company

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[19] It must be noted that there are no newspapers from the South in our sample. There are two connected reasons behind this: first, Italian newspapers are mainly based in the North and in the Center. Second, there are no online news archives regarding the time period under consideration for the two largest-circulation newspapers that are based in the South (Il Mattino di Napoli and Il Corriere del Mezzogiorno).

[20] In Italy there is a long tradition of public funding of newspapers. During the period under consideration commercial newspapers received indirect funding under two schemes: an automatic VAT reduction and a reduction of postal delivery tariffs. These subsidies apply to both newspapers and magazines and are unlikely to affect editorial bias, since they are general-purpose provisions. In 2006 and 2007 political newspaper received direct subsidies from the Government Office for Information and Publishing ("Dipartimento per l'Informazione e l'Editoria") following two different laws (Article 153, Law no. 338/2000, and Article 3, Law No. 250/1990). In 2006 24 political newspapers received 47.4 million euros overall, while in 2007 26 political newspapers received 46,9 million euros. In the same year there were also two minor types of direct subsidies (i) for newspapers and magazines published by journalists' cooperatives and (ii) for newspaper and magazines that are distributed in foreign countries, while commercial newspapers did not receive any direct subsidy. In 2010 the postal delivery subsidy was canceled under the pressure of the EU Commission that considered it as an instance of State aid to Postal Services (Poste Italiane SPA). It is also the case that during the same period direct subsidies were reduced. On the other hand, VAT reduction has not been reduced and still works as an indirect subsidy for all printed products.

[21] The period 2006–2007 was a time of consolidation for the banking industry in Italy: several banks merged, changed ownership and communication policy. Mediolanum, which is included in our sample, is mainly an insurance company, with some private banking and asset management activities, but no autonomous bank branches.

[22] This is the case of Finmeccanica, which operates in aeronautics, helicopters, defense and security electronics, mostly for military purposes. It has a consistent activity of public relation and of institutional advertising, especially with newspapers.

[23] We do so because the Dow Jones Factiva archive does not allow to run "blank" searches in order to retrieve the total number of articles that were featured on a given newspaper during a given time period.

Table 1
Summary statistics.

Variable	No of obs.	Mean	Median	Std. dev.	Min	Max
Newspaper x company level variables						
Relative frequency of articles on newspaper *n* mentioning company *c* (%)	53,704	0.306	0	0.644	0	18.54839
Monthly ads expenditure, hundreds of thousands of euros	1872	0.275	0	0.749	0	8.33
Company level variables						
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.

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 characterized 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 2
Company level data, 2006–2007.

COMPANY	Number of press releases	Number of articles	Articles/ (press releases)	Relative frequency of articles (%)	Rf of articles in days after a press release (%)	Rf of articles in days with no press release (%)	Change in relative frequency after a press release (%)	Company-specific fixed effect
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	15,799	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	19,142	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
Tod's	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 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 was 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

We are 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 × newspaper × 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.[24] 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. Fig. 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.[25] 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.[26]

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. More formally, we run the following type of regression:

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

where y_{nct} is the relative frequency of articles mentioning company c appearing on newspaper n on day t, α_n and β_c are respectively a newspaper and a company fixed-effect, $ADS_{nc,m(t)-1}$ is the monetary amount of ads being purchased by company c on newspaper n during the month before the month that contains day t, $pr\_d_{c,t-1}$ is a dummy which equals one if company c issued a press release on day $t-1$, $controls_{ct}$ is a set of controls at the (company × day) level that are meant to capture the time-varying newsworthiness of companies, and ε_{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 × newspaper) level.[27]

Our regression output is displayed in Table 4, where we proceed by expanding the set of explanatory variables. Regarding controls for "residual" newsworthy events, i.e. those that press releases might not capture, in columns from (1) to (4) we include $|r_{c,t-1}|$, the absolute daily return of stock c on day $t-1$, while in columns from (5) to (7) we separately consider positive and negative stock returns. The idea of controlling for one-day lagged stock returns implies that we are only considering days that are immediately preceded by a trading day, i.e. we exclude Sundays and Mondays from the sample.[28]

In column (1) we control for purchased ads and past stock returns, while in column (2) we add the press release dummy and include interactions of that dummy and past stock returns with advertising expenditure. In column (3) we add the two ownership dummies for Corriere della Sera and Stampa that we have mentioned above, but no interaction terms of ads expenditure with the press release dummy and past stock returns, which we instead include in column (4). In column (5) we separately control for positive and negative returns, which we also interact with advertising expenditure, while in column (6) we include ownership dummies but no interaction terms, which we bring back into the set of controls in column (7).

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 (columns (3) and (6)). In terms of magnitudes, a coefficient of around 0.21 in columns (1) implies that a standard deviation increase by a given company in monthly ads expenditure, i.e. about 75,000 euros, is associated with one and a half additional article every one thousand about that company. Since

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[24] One might be worried about the influence of banks that are creditors of both companies and newspapers. In principle this sort of influence could play a role, but data on the main creditors of companies and newspapers is not readily available. We thank an anonymous referee for this suggestion.

[25] Standard errors are clustered at the (company × newspaper level), in order to account for within-cluster correlation in the error term.

[26] Of course, we are bound to analyze correlational data, in the lack of some exogenous variation in advertising expenditure, which seldom happens and did not take place within our sample. See Warner and Goldenhar (1989) for a quasi-experimental study of ads expenditure by tobacco companies on U.S. magazines after a ban on TV ads.

[27] See Bertrand et al. (2004).

[28] Appendix Table A1 replicates the format of Table 4, but does not include controls for past stock returns. This implies a larger sample which includes Sundays and Mondays, and results that are very comparable to those displayed in Table 4.

Table 3
Newspaper level data, 2006–2007.

NEWSPAPER	Number of articles on sampled companies	Total number of articles	Freq of articles on companies (%)	Freq of articles on companies the day after a press release (%)	Freq of articles on companies in the lack of a press release (%)	Change in relative frequency after a press release (%)	Newspaper fixed effect
Corriere della Sera	7848	161,137	4.87	0.77	0.32	142.95	1.10
Repubblica	12,261	335,335	3.66	0.46	0.26	74.36	1.04
Stampa	6627	91,414	7.25	1.11	0.49	125.18	1.30
Resto del Carlino	12,726	502,509	2.53	0.36	0.19	92.66	0.99
Mattino di Padova	3770	127,821	2.95	0.39	0.21	87.78	1.03
Tirreno	13,669	540,162	2.53	0.35	0.16	114.63	0.99

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.

on average there are around 13,000 total articles per month, this correlation translates in an increase of about 20 articles per month. A more conservative estimate of this effect comes from columns (3) and (6), where we control for ownership links: a coefficient of 0.087 implies that additional advertising expenditure of 75,000 euros per month is on average associated with around 0.6 additional articles every one thousand, i.e. 8 additional 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 columns (3) and (6)), an additional press release is associated with around 1.3 additional articles every one thousand that do mention that company.[29]

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 larger) when controlling for the ownership dummies (column (4)). Focusing on column (4), the magnitude of the conditional effect can be calculated as follows: at the mean level of monthly ads (about 27,000 euros per month) an additional press release is associated with 1.5 additional articles every one thousand $(0.13 + 0.087 \times 0.27)$. Correspondingly, if a firm spends twice the average in advertising, the effect rises to about 1.8 additional articles every one thousand. It would jump to around 2.2 additional articles every one thousand when considering a standard-deviation increase (i.e., around 75,000 euros per month).

Generally speaking, one could argue that the discrepancy in the estimated size and significance of the findings above 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 them.[30]

Coming to controls for real world events, we find that larger absolute returns are significantly correlated with more intense media coverage: in column (1) a coefficient of about 3.6 implies that a one percentage point increase in the absolute daily return is associated with an increase of 0.036 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 depending on the amount of ads purchased by that company on that newspaper. In column (2) 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 ads purchases: the reactivity of newspaper coverage to the absolute stock return would jump from 3.24 to 5.44, i.e. it would increase by about 70%. However, the interaction term is not statistically significant in column (4), i.e. when controlling for the ownership dummies.

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 (5)-(7) we address this issue by separately considering positive and negative returns, properly interacted with lagged ads purchases.[31] Both positive and negative returns are significantly correlated with coverage, and the same is true for the two interaction terms in column (5). On the other hand, when adding the ownership dummies (column (7)), only the interaction of ads with *positive* returns

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[29] We also explored whether advertising expenditure and PR activities have a significantly different effect in the case of company–newspaper pairs with ownership links. To do so, we interact the ownership dummies with the ads expenditure and the press release dummy. We find that the interaction terms of the ownership dummies with the press release dummy are positive and significant, i.e. coverage of a given company after a press release is significantly higher in all newspapers, but more so in newspapers that have ownership links with that company. We thank an anonymous referee for this suggestion.

[30] 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 (2) 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.

[31] Regarding negative abnormal returns, a company might purchase ads in order to deal with – and possibly minimize – the harm caused to its reputation by negative underlying events. On the other hand, a company might leverage on positive abnormal returns by buying additional ads and increasing coverage.
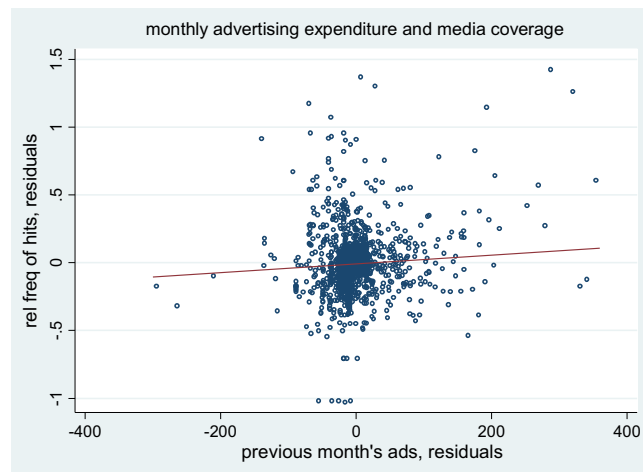
Fig. 1. The figure displays the residuals of monthly relative frequency of articles mentioning a company on a newspaper against residuals of previous month's ads by that company on that newspaper. Residuals are calculated by regressing against company and newspaper fixed effects and ownership dummies.

Table 4
Daily coverage of listed companies, company and newspaper fixed effects.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Advertising expenditure, previous month (hundreds of thousands of euros)	0.209***	0.169***	0.087***	0.049*	0.169***	0.087***	0.049*
	[0.052]	[0.060]	[0.025]	[0.025]	[0.060]	[0.025]	[0.025]
Press release dummy	–	0.109***	0.131***	0.100***	0.108***	0.131***	0.100***
		[0.019]	[0.023]	[0.018]	[0.019]	[0.023]	[0.018]
Advertising expenditure × press release dummy	–	0.056**	–	0.083***	0.056**	–	0.084***
		[0.026]		[0.025]	[0.026]		[0.026]
Dummy for owner's coverage on Corriere	–	–	0.074	0.073	–	0.074	0.074
			[0.089]	[0.088]		[0.089]	[0.088]
Dummy for owners' coverage on Stampa	–	–	1.234***	1.243***	–	1.235***	1.244***
			[0.140]	[0.142]		[0.140]	[0.142]
Absolute stock return, previous day	3.606***	2.454***	3.309***	2.679***	–	–	–
	[0.591]	[0.528]	[0.565]	[0.554]			
Advertising expenditure × absolute return	–	2.930**	–	2.289	–	–	–
		[1.227]		[1.410]			
Positive absolute return, previous day	–	–	–	–	2.757***	3.625***	2.986***
					[0.585]	[0.604]	[0.602]
Advertising expenditure × positive absolute return	–	–	–	–	2.949**	–	2.427*
					[1.130]		[1.251]
Negative absolute return, previous day	–	–	–	–	1.955***	2.788***	2.182***
					[0.515]	[0.581]	[0.560]
Advertising expenditure × negative absolute return	–	–	–	–	2.902**	–	2.032
					[1.447]		[1.746]
Test of equal slopes for positive and negative returns: p-value	–	–	–	–	0.04	0.04	0.04
Test of equal slope for interactions of ads with positive and negative returns: p-value	–	–	–	–	0.92		0.53
R squared	0.45	0.46	0.48	0.48	0.46	0.48	0.48
Number of companies	13	13	13	13	13	13	13
Number of newspapers	6	6	6	6	6	6	6
Observations	37,370	37,370	37,370	37,370	37,370	37,370	37,370
Newspaper fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper x company fixed effects	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 ads 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 are reported in brackets below each coefficient.
Starting from column (5) we separately consider positive and negative returns, and report the p-values of the tests for equal slopes. In columns (5) and (7) we also interact those returns with the ad expenditure variable, and report the p-values of the tests for equal slopes and equal interaction terms.
  * Significant at 1%.
 ** Significant at 5%.
*** Significant at 1%.

Table 5
Daily coverage of listed companies (company × newspaper) fixed effects.

	[1]	[2]	[3]	[4]	[5]	[6]
Advertising expenditure, previous month (hundreds of thousands of euros)	0.014	0.012	-0.002	0.027*	-0.007	-0.007
	[0.012]	[0.012]	[0.012]	[0.015]	[0.021]	[0.021]
Press release dummy	–	0.150***	0.120***	–	0.099***	0.099***
		[0.023]	[0.020]		[0.017]	[0.017]
Advertising expenditure × press release dummy	–	–	0.075***	–	0.081***	0.083***
			[0.018]		[0.025]	[0.026]
Absolute stock return, previous day	–	–	–	3.176***	2.461***	–
				[0.484]	[0.456]	
Advertising expenditure × absolute return	–	–	–	–	1.44	–
					[0.961]	
Positive absolute return, previous day	–	–	–	–	–	2.679***
						[0.500]
Advertising expenditure × positive absolute return	–	–	–	–	–	1.620*
						[0.921]
Negative absolute return, previous day	–	–	–	–	–	2.205***
						[0.455]
Advertising expenditure × negative absolute return	–	–	–	–	–	1.166
						[1.056]
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	53,704	53,704	53,704	37,911	37,911	37,911
Newspaper fixed effects	No	No	No	No	No	No
Company fixed effects	No	No	No	No	No	No
Newspaper × 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 × newspaper)-specific fixed effects are included in each specification. Monthly ads expenditure refers to the previous month. Standard errors are clustered at the (company × newspaper) level, and are reported in brackets below each coefficient.
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.
  * Significant at 1%.
 ** Significant at 5%.
*** Significant at 1%.

is mildly significant at the 10% confidence level. If anything, the estimated reactivity of coverage is larger for *positive* returns than for negative returns (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 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 Eq. (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. Differently from Table 4 we also include specifications that do not control for past returns (1)–(3). Moreover, ownership dummies are absorbed by (company × newspaper) fixed effects.

First, within this setup the partial correlation with monthly ads 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.[32]

Columns (4)–(5) show that past absolute return is positively and significantly associated with newspaper coverage. Similarly to what found in column (4) in Table 4, the interaction between the absolute value of the daily return and ads expenditure is not

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[32] Of course, there is less variation to be exploited when solely focusing on the time dimension of ads and coverage for a given newspaper/company pair. However, press releases might pinpoint instances when coverage and advertising expenditure are particularly relevant. We thank an anonymous referee for this suggestion.

Table 6
Robustness checks.

	Adding trading volume				Current month's ads				Three-month average ads			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Advertising expenditure	0.038	0.038	-0.025	-0.025	0.038	0.038	-0.023	-0.023	0.085*	0.084*	-0.045	-0.046
	[0.029]	[0.029]	[0.025]	[0.025]	[0.029]	[0.029]	[0.032]	[0.032]	[0.044]	[0.044]	[0.032]	[0.032]
Press release dummy	0.099***	0.098***	0.099***	0.099***	0.099***	0.099***	0.101***	0.101***	0.089***	0.088***	0.089***	0.088***
	[0.017]	[0.017]	[0.017]	[0.017]	[0.019]	[0.019]	[0.018]	[0.018]	[0.018]	[0.018]	[0.017]	[0.017]
Advertising expenditure × press release dummy	0.078***	0.079***	0.076***	0.076***	0.080*	0.081*	0.074*	0.075*	0.115***	0.118***	0.112***	0.115***
	[0.026]	[0.028]	[0.026]	[0.027]	[0.042]	[0.043]	[0.040]	[0.042]	[0.027]	[0.028]	[0.025]	[0.026]
Dummy for owner's coverage on Corriere	0.081	0.081	–	–	0.085	0.085	–	–	0.05	0.05	–	–
	[0.090]	[0.090]			[0.091]	[0.091]			[0.086]	[0.086]		
Dummy for owners' coverage on Stampa	1.302***	1.302***	–	–	1.273***	1.272***	–	–	1.141***	1.142***	–	–
	[0.151]	[0.151]			[0.145]	[0.145]			[0.167]	[0.168]		
Absolute stock return, previous day	2.197***	–	2.229***	–	2.432***	–	2.450***	–	2.610***	–	2.700***	–
	[0.462]		[0.443]		[0.462]		[0.445]		[0.525]		[0.504]	
Advertising expenditure × absolute return	0.706	–	0.511	–	1.887*	–	1.702**	–	0.907	–	0.766	–
	[0.893]		[0.684]		[1.011]		[0.743]		[1.275]		[1.164]	
Positive absolute return, previous day	–	2.404***	–	2.443***	–	2.652***	–	2.679***	–	2.797***	–	2.875***
		[0.513]		[0.495]		[0.517]		[0.501]		[0.563]		[0.539]
Advertising expenditure × positive absolute return	–	0.703	–	0.504	–	2.107**	–	1.884***	–	1.298	–	1.199
		[0.890]		[0.687]		[0.971]		[0.663]		[1.274]		[1.136]
Negative absolute return, previous day	–	1.940***	–	1.962***	–	2.166***	–	2.171***	–	2.389***	–	2.497***
		[0.455]		[0.439]		[0.461]		[0.442]		[0.533]		[0.520]
Advertising expenditure × negative absolute return	–	0.715	–	0.526	–	1.608	–	1.474	–	0.419	–	0.223
		[1.021]		[0.881]		[1.149]		[0.960]		[1.339]		[1.265]
Trading volume, previous day	0.001**	0.001**	0.001**	0.001**	–	–	–	–	–	–	–	–
	[0.000]	[0.000]	[0.000]	[0.000]								
Advertising expenditure × trading volume	0	0	0.000*	0.000*	–	–	–	–	–	–	–	–
	[0.000]	[0.000]	[0.000]	[0.000]								
Test of equal slopes for positive and negative returns: p-value	–	0.14	–	0.14	–	0.16	–	0.14	–	0.21	–	0.25
Test of equal slope for interactions of ads with positive and negative returns: p-value	–	0.98	–	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	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911
Newspaper fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Company fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Newspaper × 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 × 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 average ads expenditure during the past three months. Standard errors are clustered at the (company × newspaper) level, and are reported in brackets below each coefficient.
See previous tables for notes regarding specific variables.
  * Significant at 1%.
 ** Significant at 5%.
*** Significant at 1%.

Table 7
Robustness checks, subsample regressions.

	National newspapers				Regional newspapers				State-owned companies			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Advertising expenditure	0.012	0.011	0.002	0.002	-0.192	-0.191	-0.064*	-0.064*	-0.088	-0.083	-0.107***	-0.100***
	[0.020]	[0.021]	[0.022]	[0.022]	[0.119]	[0.119]	[0.037]	[0.037]	[0.053]	[0.053]	[0.036]	[0.034]
Press release dummy	0.172***	0.171***	0.171***	0.171***	0.047***	0.047***	0.046***	0.046***	0.121***	0.121***	0.119***	0.118***
	[0.032]	[0.032]	[0.032]	[0.032]	[0.015]	[0.015]	[0.014]	[0.014]	[0.032]	[0.032]	[0.033]	[0.033]
Advertising × press release dummy	0.054*	0.055*	0.054*	0.055*	0.067	0.07	0.063**	0.066**	0.148***	0.149***	0.152**	0.153**
	[0.028]	[0.029]	[0.027]	[0.028]	[0.050]	[0.050]	[0.028]	[0.029]	[0.045]	[0.046]	[0.044]	[0.045]
Dummy for owner's coverage on Corriere	-0.05	-0.05	–	–	–	–	–	–	–	–	–	–
	[0.038]	[0.038]										
Dummy for owners' coverage on Stampa	1.108***	1.109***	–	–	–	–	–	–	–	–	–	–
	[0.049]	[0.049]										
Absolute stock return, previous day	5.331***	–	5.288***	–	0.449*	–	0.394*	–	5.992***	–	6.147***	–
	[0.964]		[0.964]		[0.225]		[0.208]		[1.724]		[1.729]	
Advertising expenditure × absolute return	1.527	–	1.59	–	1.134	–	2.310***	–	3.317**	–	3.410**	–
	[1.414]		[1.435]		[1.027]		[0.610]		[1.531]		[1.593]	
Positive absolute return, previous day	–	5.782***	–	5.748***	–	0.619**	–	0.563**	–	6.231**	–	6.529**
		[1.016]		[1.015]		[0.294]		[0.258]		[2.159]		[2.188]
Advertising expenditure × positive absolute return	–	1.597	–	1.651	–	1.850*	–	2.948***	–	0.646	–	-0.051
		[1.208]		[1.221]		[0.972]		[0.585]		[2.342]		[2.284]
Negative absolute return, previous day	–	4.591***	–	4.532***	–	0.189	–	0.134	–	5.874***	–	5.877***
		[1.010]		[1.014]		[0.312]		[0.325]		[1.989]		[2.009]
Advertising expenditure × negative absolute return	–	1.407	–	1.485	–	-0.447	–	0.892	–	4.622*	–	5.137*
		[1.855]		[1.893]		[1.592]		[1.220]		[2.482]		[2.725]
Test of equal slopes for positive and negative returns: p-value	–	0.07	–	0.07	–	0.31	–	0.29	–	0.88	–	0.79
Test of equal slope for interactions of ads with positive and negative returns: p-value	–	0.81	–	0.84	–	0.1	–	0.07	–	0.34	–	0.23
R squared	0.49	0.5	0.51	0.51	0.47	0.47	0.52	0.52	0.29	0.29	0.35	0.35
Number of companies	13	13	13	13	13	13	13	13	13	13	13	13
Number of newspapers	3	3	3	3	3	3	3	3	6	6	6	6
Observations	19,089	19,089	19,089	19,089	18,281	18,281	18,281	18,281	8629	8629	8629	8629
Newspaper fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Company fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Newspaper × 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 × newspaper) fixed effects are included as well. In columns (1)–(4) we focus on national newspapers only (Corriere della Sera, Repubblica and La Stampa), while in columns (5)–(8) we focus on regional newspapers, i.e. Resto del Carlino, Mattino di Padova, and Tirreno. In columns (9)–(12) we consider all newspapers, but our sample of companies is restricted to those that are state-owned, i.e. ENEL, ENI and Finmeccanica. Standard errors are clustered at the (company × newspaper) level, and are reported in brackets below each coefficient.
See previous tables for notes regarding specific variables.

  * Significant at 1%.
 ** Significant at 5%.
*** Significant at 1%.

statistically significant. 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 Lamont and Frazzini, 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 × 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 pretty 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 × newspaper) fixed effects. Compared to the baseline results shown in Tables 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 average amount of ads expenditure during the last three months, again 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 is 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.[33]

It is worthwhile to check whether results on the whole sample mask some heterogeneity across subsamples of newspapers or companies. We perform this set of exercises in Table 7. First, broadly following Reuter and Zitzewitz (2006), we distinguish between national newspapers (Corriere della Sera, Repubblica and La Stampa) and regional newspapers (Resto del Carlino, Mattino di Padova, Tirreno), and run our baseline regressions on these two subsamples.

To facilitate the reader, Table 7 replicates the format of Table 6: for each subsample we first control for company and newspaper fixed effects, and then for (company × newspaper) fixed effects. For both types of fixed effects, we first control for absolute returns and then distinguish between positive and negative returns.

Columns (1)–(4) are devoted to national newspapers, while columns (5)–(8) deal with regional ones. When controlling for newspaper and company fixed effects, we find that coverage is positively and significantly correlated with the interaction between the press release dummy and the amount of purchased ads only for the subsample of national newspapers. On the other hand, when controlling for (company × newspaper) fixed effects the interaction term between ads and the press release dummy is significant with both subsamples, and more strongly so for regional newspapers. In this latter case, it is also true that the simple correlation between coverage and purchased ads is mildly significant and negative.[34] An explanation consistent with this finding is that regional newspapers have less room for stories regarding listed companies: to the extent that negative stories are more newsworthy than positive stories, in the lack of a press release i.e., in the lack of positive stories initiated by the company itself – the purchase of ads on those outlets might serve the purpose of avoiding negative coverage. Interestingly, the interaction between positive abnormal returns and

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[33] Appendix Table A2 replicates the format of Table 6, but with the addition of day fixed effects in each specification. The pattern of our findings is robust to this exercise; if anything, the interaction between ads expenditure and the press release dummy is more precisely estimated here.

[34] This correlation is however not very robust, since it is no longer significant when controlling for contemporaneous ads, or average ads expenditure during the last three months (results available upon request).

purchased ads is positive and statistically significant at ordinary confidence levels only in the case of regional newspapers (columns (6) and (8)).[35]

In columns (9)–(12) we restrict our sample to state-owned companies, i.e. ENEL, ENI and Finmeccanica. We find a strongly significant and positive coefficient on the interaction between the amount of purchased ads and the press release dummy. Moreover, when controlling for (company × newspaper) fixed effects we find a negative and strongly significant correlation between ads and coverage. Finally, for both types of fixed effects, we find a positive and significant interaction between negative abnormal returns and purchased ads. A reasonable rationale for those findings is related to the fact that two of those three companies are utilities (ENEL and ENI), while Finmeccanica is active in the defense sector. From this it follows that it is less likely that there are news about product innovation that are interesting to newspapers' readers, but at the same time – because of those companies being state-owned – there is a larger risk of negative stories about politically motivated appointments etc. So those companies might find it optimal to safeguard their reputation by using ads to have *less* negative stories being published. This is also consistent with the positive interaction between negative returns and ads: those companies might especially want to buy visibility to their own point of view when the turn of events –as signaled by negative stock returns – is more problematic to them.[36]

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 × 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.

We also find some evidence that – in the lack of company-originated stories, as signaled by the issuance of press-releases – in the case of regional newspapers and of state-owned firms companies might buy ads to reduce negative coverage.

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. Hence readers would face a more challenging signal extraction problem, since they must disentangle to what extent coverage of company-related events is driven by advertiser bias as well, on top of the usual – and more reassuring – newsworthiness criterion. Also, if attention-scarce readers are net buyers of companies that are mentioned by the press (as Barber and Odean, 2008 suggest), systematic variations in the cost of capital faced by companies might be driven by the differential propensity to buy advertising space, and by the differential success in influencing coverage thanks to ads expenditure.

Regarding future research, on the intensive margin it would be worthwhile to correlate daily coverage with the daily amount of ads appearing on a given newspaper. Following Ellman and Germano (2009), it could be the case that advertising of a company is more influential on potential customers if on the same day there are articles that mention it, so that in equilibrium this contemporaneous appearance of ads and articles takes place more often. On the opposite side, in order to avert suspicions of pro-advertiser bias, newspapers might refrain from matching ads and articles on the same day. Whether the former or the latter effect dominates is an empirical matter. On the other hand, if companies can commit ex ante to withdrawing ads in case of too negative coverage (as in the second version of their model), there is no good a priori reason to expect high-frequency correlation between ads and coverage.[37]

We also 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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[35] Similarly to the distinction in Reuter and Zitzewitz (2006) between national newspapers and personal finance magazines, national newspapers might have a higher degree of reputability than regional newspapers, which helps explain some of the differential results discussed in the text, especially those regarding the interactions of ads expenditure with the press release dummy and with positive abnormal returns.

[36] We thank an anonymous referee for suggesting this type of interpretation.

[37] We again thank an anonymous referee for this suggestion.

Acknowledgments

Appendix A

Table A1
Daily coverage of listed companies, company and newspaper fixed effects, no financial controls.

	[1]	[2]	[3]	[4]	[5]
Advertising expenditure, previous month (hundreds of thousands of euros)	0.193[***] [0.054]	0.192[***] [0.054]	0.184[***] [0.055]	0.063[**] [0.025]	0.049[*] [0.026]
Press release dummy	–	0.147[***] [0.023]	0.129[***] [0.021]	0.150[***] [0.023]	0.120[***] [0.020]
Advertising expenditure × press release dummy	–	–	0.046[**] [0.023]	–	0.076[***] [0.021]
Dummy for owner's coverage on Corriere	–	–	–	0.059 [0.080]	0.061 [0.080]
Dummy for owners' coverage on Stampa	–	–	–	1.343[***] [0.140]	1.360[***] [0.141]
R squared	0.45	0.45	0.46	0.48	0.49
Number of companies	13	13	13	13	13
Number of newspapers	6	6	6	6	6
Observations	53,704	53,704	53,704	53,704	53,704
Newspaper fixed effects	Yes	Yes	Yes	Yes	Yes
Company fixed effects	Yes	Yes	Yes	Yes	Yes
Newspaper × company fixed effects	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 ads 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 × newspaper) level, and are reported in brackets below each coefficient.
  * Significant at 1%.
 ** Significant at 5%.
*** Significant at 1%.

Table A2
Robustness checks, with day fixed effects.

	Trading volume				Current month's ads				Three-month average ads			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Advertising expenditure	0.047 [0.030]	0.047 [0.030]	-0.019 [0.022]	-0.019 [0.022]	0.04 [0.029]	0.04 [0.029]	-0.025 [0.031]	-0.025 [0.031]	0.093[**] [0.046]	0.093[**] [0.046]	-0.037 [0.028]	-0.038 [0.028]
Press release dummy	0.086[***] [0.015]	0.087[***] [0.015]	0.087[***] [0.015]	0.087[***] [0.015]	0.085[***] [0.018]	0.085[***] [0.019]	0.086[***] [0.018]	0.086[***] [0.018]	0.074[***] [0.017]	0.073[***] [0.017]	0.075[***] [0.016]	0.074[***] [0.016]
Advertising expenditure × press release dummy	0.079[***] [0.026]	0.079[***] [0.027]	0.076[***] [0.027]	0.076[***] [0.028]	0.084[***] [0.040]	0.085[***] [0.041]	0.078[***] [0.038]	0.079[***] [0.040]	0.117[***] [0.026]	0.120[***] [0.027]	0.113[***] [0.025]	0.116[***] [0.026]
Dummy for owner's coverage on Corriere	0.076 [0.090]	0.076 [0.090]	–	–	0.084 [0.092]	0.084 [0.092]	–	–	0.043 [0.087]	0.043 [0.087]	–	–
Dummy for owners' coverage on Stampa	1.278[***] [0.151]	1.278[***] [0.151]	–	–	1.271[***] [0.147]	1.270[***] [0.147]	–	–	1.114[***] [0.174]	1.114[***] [0.174]	–	–
Absolute stock return, previous day	2.576[***] [0.481]	–	2.600[***] [0.464]	–	2.903[***] [0.511]	–	2.876[***] [0.490]	–	3.024[***] [0.562]	–	3.094[***] [0.544]	–
Advertising expenditure × absolute return	0.622 [0.894]	–	0.44 [0.691]	–	1.728[*] [0.976]	–	1.541[**] [0.704]	–	0.872 [1.265]	–	0.741 [1.168]	–
Positive absolute return, previous day	–	2.644[***] [0.537]	–	2.679[***] [0.514]	–	2.960[***] [0.572]	–	2.954[***] [0.547]	–	3.061[***] [0.599]	–	3.138[***] [0.572]
Advertising expenditure × positive absolute return	–	0.558 [0.874]	–	0.373 [0.667]	–	1.995[**] [0.959]	–	1.772[***] [0.640]	–	1.218 [1.251]	–	1.131 [1.128]
Negative absolute return, previous day	–	2.464[***] [0.481]	–	2.469[***] [0.480]	–	2.781[***] [0.520]	–	2.719[***] [0.504]	–	2.917[***] [0.582]	–	2.969[***] [0.576]

Table A2 (continued)

	Trading volume				Current month's ads				Three-month average ads			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Advertising expenditure × negative absolute return	–	0.716 [1.047]	–	0.537 [0.918]	–	1.386 [1.071]	–	1.25 [0.885]	–	0.444 [1.336]	–	0.256 [1.276]
Trading volume, previous day	0.001** [0.000]	0.001** [0.000]	0.001** [0.000]	0.001** [0.000]	–	–	–	–	–	–	–	–
Advertising expenditure × trading volume	0 [0.000]	0 [0.000]	0.000* [0.000]	0.000* [0.000]	–	–	–	–	–	–	–	–
Test of equal slopes for positive and negative returns: p–value	–	0.65	–	0.6	–	0.69	–	0.59	–	0.73	–	0.68
Test of equal slope for interactions of ads with positive and negative returns: p–value	–	0.81	–	0.83	–	0.17	–	0.29	–	0.06	–	0.04
R squared	0.5	0.5	0.54	0.54	0.49	0.49	0.54	0.54	0.5	0.5	0.54	0.54
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	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911	37,911
Newspaper fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Company fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Newspaper × company fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Day fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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. It is a replica of Table 6, with the addition of day fixed effects. Standard errors are clustered at the (company × newspaper) level, and are reported in brackets below each coefficient. See previous tables for notes regarding specific variables.

  * Significant at 1%.
 ** Significant at 5%.
*** Significant at 1%.

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