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A Friendly Turn: Advertising Bias in the News Media*

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February 2014

Abstract

This paper investigates whether newspapers report more favorably about advertising corporate clients than about other firms. Our identification strategy based on high-dimensional fixed effects and high frequency advertising data shows that advertising leads to more positive press coverage. This advertising bias in reporting is found among local and national newspapers. Further results show that advertising bias manifests particularly in less negative reporting after bad news events such as negative earnings surprises or extremely negative stock returns. Our findings cast doubt on the independence of the press from corporate pressure and hint at important information frictions.

JEL-Classification Codes: M37, M38

Keywords: Media, Advertising Bias, Newspapers, Financial Markets

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I headed the "Wall Street Journal" for 16 years. We made money from advertising and we constantly wrote about our advertising clients. Sometimes we criticized them harshly, sometimes they threatened us to stop advertising, sometimes they stopped advertising. However, we didn't allow them to bias our reports.

– Paul Steiger

Der Spiegel, Vol. 44, October 2013.

1 Introduction

Capital market efficiency crucially depends on the timely availability of information. The news media plays an important role in information dissemination. According to the Newspaper Association of America, the vast majority of U.S. adults reads newspaper media content in print or online or accesses it on mobile devices.¹ Thus, the news media reaches a broad population of potential investors and alleviates information frictions on financial markets by distributing news to a wide audience. In line with this view, Chan (2003) and Fang and Peress (2009) show that stocks with no media coverage have higher abnormal returns and stronger post-earnings announcement drift than stocks with high media coverage. A similar result is obtained by Bushee, Core, Guay, and Hamm (2010) who find that greater press coverage reduces information asymmetries around earnings announcements.

Given that the news media holds an outstanding role as information intermediary, it is important that its reports are accurate and unbiased. Therefore, most industrialized countries established freedom of press laws in their constitutions to ensure that the media are not captured by politicians or powerful business groups.² The rise of advertising in the nineteenth-century and the associated revenues for newspapers created a press largely independent from political influence (Petrova (2011)). However, at the same time, newspapers that receive advertising revenues act in a classical two-sided market (Rochet and Tirole (2003)) and might thus be subject to corporate influence: on the one hand, they provide news and typically charge a price for each issue from their readers. Readers want objective

¹<http://www.naa.org/Trends-and-Numbers/Readership.aspx>

²See 2013 World Press Freedom Index, <http://en.rsf.org/press-freedom-index-2013,1054.html>

information that caters to their tastes. On the other hand, newspapers sell advertising space to firms that are interested in reaching as many readers (i.e. potential customers) as possible and in being covered positively in the news.

According to the Newspaper Association of America, around 70% of newspapers' revenues are obtained from advertising, while only about 30% are obtained from circulation.³ Thus, advertising is the dominant source of revenue for most newspapers. The dependence of newspapers on their advertising corporate clients might distort incentives to report objectively about these clients, if advertising clients try to exert pressure on newspapers. There is indeed some anecdotal evidence suggesting that newspapers sometimes tilt reporting in order to please their advertisers. For example, magazines that had a high part of their revenues coming from tobacco companies did report less about smoking causing lung cancer (Weis and Burke (1986)). Furthermore, Nyilasy and Reid (2011) present survey results according to which 70 to 90% of US newspaper editors had experienced pressure by advertisers, but that the overwhelming majority indicate that they do not bend to such pressure.

This paper investigates whether advertising has an impact on how newspapers report about their advertising corporate clients. The sample spans from 1999 to 2012 and covers advertising expenditures and press coverage on firms in a broad sample of national and local US newspapers. Based on weekly firm and newspaper level advertising data, we show that newspapers are more likely to cover their advertising client firms and that they tend to write longer articles about firms that advertise in them. More importantly, we also document that articles on a firm are indeed more positive if the firm spends more on advertising in this newspaper. Due to the high frequency and high dimensionality (firm, time, and newspaper dimension) of our advertising and press coverage data, we are able to make a crucial step towards establishing causality by including firm-week as well as firm-newspaper fixed effects in our analysis. Particularly the inclusion of combined firm-newspaper fixed effects is important, as this allows us to control for any preferences certain newspapers

³<http://www.naa.org/Trends-and-Numbers/Newspaper-Revenue/Newspaper-Media-Industry-Revenue-Profile-2012.aspx>

might have for certain firms for other reasons than their advertising. This approach alleviates endogeneity concerns as our main result can only be driven by time varying advertisement expenditures within a firm-newspaper pair.

We also implement a panel vector autoregressive (VAR) model to analyze the temporal dynamics of the relation between advertising and news tone. Our results support the notion that it is past advertising that has an impact on the tone of future press coverage, while there is only a very weak link between the past tone of press coverage and future advertising.

To shed some light on how and when exactly newspaper tilt news, we analyze in more detail how newspapers react upon financial market news. We focus on two news items that are relevant to investors: earnings announcements and extreme daily returns as in Barber and Odean (2008). We find that advertising bias is strongest in articles on firms with bottom quintile earnings surprises and with extremely bad stock market returns. These results show that newspapers mainly bias coverage of bad news, while there is no evidence of positively biased articles on good news.

Overall, our results suggest that economic incentives have an adverse impact on the independence of the news media. The need to generate profits based on advertising makes news outlets dependent on their corporate clients and creates an incentive to report about these clients in a more positive way. This has important implications for financial markets, where a lack of unbiased information might distort the price discovery process. If investors rely on newspapers but obtain biased information that does not accurately reflect a company's economic situation, their investment decisions might be biased towards the advertising clients of their daily newspaper. Eventually, these firms might be overpriced as compared to firms that do not engage in advertising activities to the same extent.

Our results also have broader implications beyond investors and capital markets. Newspaper readers base many important decisions like purchases of consumption goods on the information they get from newspapers. If this information is biased, this can easily lead

to suboptimal decisions not only regarding financial investments but also in many other domains and eventually to severe adverse welfare consequences.

Our paper contributes to various strands of the literature. There are several theoretical models that investigate the impact of advertising on news tone, i.e. advertising bias of newspapers. Blasco, Pin, and Sobbrío (2012) set up a model where advertisers may pay a media outlet to conceal negative information about the quality of their products. In their model, advertisers' success in influencing media outlets depends on the degree of competition between advertisers. In a similar vein, Stroemberg (2004) models the incentives of the media to deliver news to different groups. The author argues that advertising financing of media firms induces them to provide more news to groups that are valuable to advertisers. Finally, Ellman and Germano (2009) develop a game-theoretical model in which advertisers are also concerned about the content of articles surrounding their advertisements. We contribute to this theoretical literature by showing empirically that advertisers indeed have an impact on media reporting and are successful in mitigating negative news coverage, particularly after bad corporate events.

There are also a couple of papers investigating the relation between advertising and a firm's press coverage empirically. For the mutual fund industry, Reuter and Zitzewitz (2006) show that funds are mentioned more positively in personal finance magazines in which they advertise. A similar result is obtained by Reuter (2009) for wine ratings. On a more general scale, Gambaro and Puglisi (2009) show that newspaper coverage of a firm is positively related with the amount of advertisements that the firm commissioned at that newspaper. However, their analysis is based on a very small sample of only 13 Italian firms and 6 different newspapers between 2006 and 2007. A similar result is shown in de Smet and Vanormelingen (2012) based on 57 Belgian companies and 8 newspapers between 2001 and 2005. The setting of both papers, Gambaro and Puglisi (2009) and de Smet and Vanormelingen (2012) does not allow for the inclusion of the same set of high-dimensional fixed effects for identification that we can use. Furthermore, while these papers only look at coverage per se, our investigation

mainly focuses on the tone of newspaper coverage based on a linguistic analysis. The paper that is probably most closely related to ours is Gurun and Butler (2012). They show that local media outlets report more favorable about local firms than about distant firms and argue that this might be due to local firms advertising in local media outlets. However, due to data limitations they can only provide indirect evidence on a potential impact of advertising on news tone, because they do not have disaggregate information on how much a firm spends on advertising in which individual newspaper. In contrast, the granularity of our data allows us make a big step towards establishing causality in the relationship between advertising and media coverage for the first time.

The paper is organized as follows. Section 2 describes the different data sets used in our analysis and presents univariate statistics. In Section 3, we investigate the impact of advertising on media coverage of corporate advertising clients. The impact of specifically defined news events on advertising bias is analyzed in Section 4. Section 5 concludes.

2 Data and summary statistics

2.1 Advertising data

We obtain advertising data from Kantar Media, a US subsidiary of the British advertising and public relations company WPP Plc. Kantar Media collects all advertisements that are published in a core set of 155 US newspapers. Their proprietary database, “Kantar Media Strategy”, contains the advertisement’s publication date, the news outlet in which it is published, and the firm that commissioned the advertisement. In addition, each advertisement is associated with a cost using “rate cards” that indicate advertising prices depending on size, product categories, and days of week or sections. These data allow us to run the analysis on the firm-newspaper-day level. We will later mainly use aggregate data on the firm-newspaper-week level.

Advertising data are available from 1995 to 2012 for the Wall Street Journal and the USA Today. For all other newspapers, data are available from 1999 to 2012. Overall, Kantar tracks advertising expenditures totaling 322bn USD.⁴

Based on the Kantar Media data, we create a list of all firms that commissioned advertising in one of the 155 US newspapers in our sample period.

2.2 Press coverage of firms

We use LexisNexis to retrieve newspaper articles on our sample firms. Out of the 155 US newspapers that are covered by Kantar Media, 41 newspapers are also covered by LexisNexis. The full list of newspapers that are covered by both, Kantar and LexisNexis, and are thus included in our analysis, is provided in Appendix 5.1. Unlike previous studies, our sample includes all big national newspapers, i.e. the New York Times, USA Today, the Wall Street Journal, and the Washington Post. It also includes most major local newspapers such as the Salt Lake Tribune.

From LexisNexis, we download all articles on publicly listed firms between 1995 and 2012 that are included in the CRSP database (share codes 10 or 11). In the next step, we focus on those articles that appeared in one of the 41 newspapers that are covered by Kantar as well as LexisNexis. Then, we merge these articles to the list of firms that we extract from the Kantar Media database, using the CRSP company permco identifier. Thus, the sample includes all firms that appear at least once as an advertiser in the Kantar data *and* are at least covered once in one of the 41 newspapers of LexisNexis.

We exclude articles with less than 20 words and conduct some cross checks to make sure that the newspaper articles are indeed about the firm of our list.⁵ Overall, we obtain 1,489,610 articles on 3,739 different companies. Aggregated to the weekly level, this results

⁴The Newspaper Association of America reports advertising revenues totaling 533bn USD for all covered US newspapers. Thus, our data cover roughly 60% of all print advertisements in US newspapers.

⁵See Appendix 5.2 for further details on the data cleansing process.

in 961,528 firm-week-newspaper observations. We then use a computer linguistic program to quantify the tone of each newspaper article. This program automatically processes text files and analyzes their content based on an internal dictionary. To classify articles as positive or negative, we follow the approach of prior papers concerned with textual analysis and use the Loughran and McDonald (2011) dictionary (LMD) of positive and negative words.⁶ This dictionary was designed to specifically capture the tone of text in a financial context. Following Loughran and McDonald (2011), we also account for negations that could bias the results of word lists designed to measure positive tone. Simple negation is taken to be observations of one of six words (no, not, none, neither, never, nobody) occurring within three words preceding a positive word. Unlike positive words, negative words are negated very rarely in the English language. Thus, we would not expect negations to bias the results of word lists that measure negative tone phrases and do not consider them for these lists. Based on the LMD dictionaries, we calculate a positive and a negative tone measure, LMD^+ and LMD^- , by dividing the number of positive and negative words, respectively, from the word lists by the total number of words in an article. If there is more than one article on a firm in a newspaper in a given week, we use the mean.

Summary statistics on our advertising and press coverage variables are presented in Table 1. Data are aggregated on the weekly level to ensure that a sufficient number of observations for each point in time is available.

— Please insert TABLE 1 approximately here —

There are two ways of constructing our main sample. In Panel A, we only include observations of firms that are mentioned in at least one newspaper article in a given week. Observations of firms that are not mentioned in any of the newspapers in our sample in a given week are dropped from the sample. In Panel B, we set the latter equal to zero and thus include these observations in our analysis, too.

⁶The LMD dictionaries are obtained from Bill McDonald's webpage.

In the first line we present average advertising expenditures over the week before a newspaper article is published on an advertising firm. We find that the dollar amount of advertising expenditures is much higher one week before a newspaper writes an article on a given firm (21,040 USD in Panel A) compared to all weeks in the sample (2,030 USD in Panel B). A similar pattern is observed in the second line, where we compare the sum of advertising expenditures over a time period of four weeks before a newspaper article on a firm is published (84,100 USD in Panel A) compared to all four week periods in the sample (8,140 USD in Panel B).

Regarding our press coverage variables, we find that there are on average 1.55 articles on a firm in a given week in Panel A. The average article comprises 790 words. The fraction of negative words per article according to the LMD measure is 1.87%, while the fraction of positive words is 0.7%. Given that the negative word list comprises more words than the positive word list, the higher fraction of negative words than positive words in a newspaper article is not surprising.

While the tone measure based on the LMD dictionary has the appeal that it is straightforward and has a simple interpretation, it has two disadvantages: First, it does not take into account the length of an article, i.e. a very short article with 5% negative words receives the same score as a very long article with 5% negative words. Second, a realization of zero for the negative (positive) measure indicates that there are no negative (positive) words in an article at all, i.e. that the article is extremely positive (negative). Thus, zero can not be interpreted as a neutral realization of this measure. Based on this method it is not possible to assign zero to cases where there are no articles on a specific firm in a newspaper in a certain week. Given that some of our later empirical analysis requires uninterrupted time-series of our tone measure per company and newspaper, we also compute two media content measures that allow us to include these cases. Specifically, we compute two measures of media content that take into account the tone as well as the length of a given article. This allows us to differentiate between the impact of, for example, a very short

negative article and a very long negative article. Our first measure, $MC1$, is computed as one divided by the product of the tone measure plus one multiplied by the logarithm of an article’s number of words.⁷ This measure has the advantage that it is decreasing in the negativity of an article but increasing in its length. Thus, it captures the idea that any news might be good news for a firm, while taking into account that given the length of an article, a less negative article is preferred. However, not all news might be good news. Longer articles might be favorable only for good news, whereas a short negative article might be preferred to a long one. Thus, we also define a second measure, $MC2$, which is computed as minus one times the demeaned tone measure multiplied by the logarithm of an article’s number of words. This measure has the appealing features that (i) it is always decreasing in negativity and increasing in article length for above average tone articles and vice versa for below-average tone articles, (ii) that week/firm/newspaper-combinations without any article can be assigned a neutral value of zero. Summary statistics on these variables are also displayed in Table 1.

2.3 Univariate differences in press coverage conditional on advertising

To test whether there are any significant differences in news coverage of firms that advertise in a given newspaper in a specific week and firms that do not advertise in that newspaper-week, we conduct a univariate analysis based on our press coverage variables. The sample includes those observations with at least one article about a firm within a newspaper-week combination.

We define a firm as “Advertiser” at a given newspaper if it has positive advertisement expenditures in the previous one (or, alternatively, four) weeks at this newspaper. If the firm has not spent any money on advertising at a given newspaper over the past one (or, alternatively, four) weeks, we define it as “Non-Advertiser”. Then, we analyze differences

⁷The construction of all variables is described in more detail in Appendix 5.3.

in press coverage and in our news tone measures between advertisers and non-advertisers. Results are presented in Table 2.

— Please insert TABLE 2 approximately here —

Consistent with the differences found between Panels A and B in Table 1, results in Panel A of Table 2 show that the number of articles published about a firm in a given newspaper is significantly larger if the firm has commissioned advertisement in this newspaper during the previous week. This difference is economically large; while there are on average 1.45 articles on a firm that did not advertise in a given newspaper, there are on average 1.91 articles if the firm did advertise over the past week. We observe an equally large difference if we look at the number of words in a given article (where the number of words is calculated conditional on at least one article on the firm appeared in the newspaper). While an article comprises about 1,034 words for firms classified as “Advertiser”, it only comprises about 728 words for firms classified as “Non-Advertiser”.

With respect to the tone of the newspaper articles, results based on the LMD tone measure indicate that articles on advertisers are significantly less negative than articles on non-advertisers. At the same time, newspaper articles on advertisers are significantly more positive than articles on non-advertisers. Our media content measures that take into account the length of an article ($MC1$ and $MC2$) also portray a consistent picture by showing that advertisers receive more positive and less negative news coverage than non-advertisers.

We obtain very similar results if we compare differences in advertising expenditures over the past four weeks instead of one week before a newspaper article on a particular firm is published. Results are displayed in Panel B. We find that media coverage is higher for advertisers than for non-advertisers. In addition, the fraction of positive words in an article is significantly higher for advertisers than for non-advertisers, while the opposite pattern is observed for the fraction of negative words. Results based on the two MC measures also confirm this finding.

Finally, we investigate how our different measures of press coverage and tone as well as advertising expenditures are correlated in our sample period. Results are presented in Table 3.

— Please insert TABLE 3 approximately here —

As expected, we find that the sum of a firm’s advertising expenditures over a time period of either one week or four weeks before an article is published on the firm is positively correlated with the number of articles as well as the article’s number of words.⁸ That is, lagged advertising expenditures at a newspaper are positively correlated with future media coverage of this firm in the newspaper. The correlation is significant at the 1% level. At the same time, we observe a significant negative correlation between advertising expenditures and the fraction of negative words in articles about the advertising firm in this newspaper, while there is a significant positive correlation between advertising expenditures and the fraction of positive words in these articles.

Taken together, results in Tables 2 and 3 provide first indicative evidence that a firm’s press coverage is correlated with its advertising expenditures at the corresponding newspaper. In the next step, we turn to a multivariate regression analysis including high dimensional fixed effects to establish a causal link between lagged advertising expenditures and future media coverage.

⁸In our main analysis, we look at time periods of one and four weeks as natural choices. Our results (not reported) also obtain if we consider time periods of two or three weeks. Generally they tend to become weaker in economic terms the longer the time period.

3 The impact of advertising on press coverage and news tone

3.1 Main results

To investigate whether a newspaper reports differently about its advertising clients than about firms that do not advertise in this newspaper, we relate various proxies of a firm’s media coverage to its advertising expenditures in a given newspaper. The analysis is conducted on the firm-newspaper-week level. Therefore, we can include various combinations of fixed effects in our regressions, which will help us to identify a causal link between a firm’s advertising expenditures and its media coverage. Specifically, we include firm-week fixed effects to control for variation in information events of a firm over time, such as for example earnings announcements, product launches, or other newsworthy events. To account for different writing styles and tastes across newspapers, we also include newspaper fixed effects. An even stricter specification includes newspaper-industry fixed effects to control for differences in industry coverage across newspapers. For example, newspapers located in Michigan might be more likely to cover the automotive industry and write more positively about automotive firms, than newspapers located in other states. At the same time, firms in the automotive industry might advertise more in automotive friendly newspapers. Newspaper-industry fixed effects take this effect into account. Finally, in the most restrictive setting, we can even include combined firm-newspaper fixed effects in addition to firm-week fixed effects. This would control for any preferences certain newspapers might have for specific firms that might not be related to advertising. In this extremely restrictive specification, only time varying variables in the firm-newspaper relation can drive our findings. Any results we might obtain are a lower bound for the actual impact of advertising on news coverage and news tone as they are exclusively driven by within firm-newspaper pair time-series variation. Results are presented in Table 4.

— Please insert TABLE 4 approximately here —

In Panel A, we investigate the impact of advertising expenditures on the number of articles and the length of articles that are written on a particular firm. We find that there are significantly more articles written on a firm in a given newspaper, the higher the firm's advertising expenditures over a time period of four weeks before the publication date in this newspaper are.⁹ At the same time, a given article is significantly longer. This result holds no matter whether we include firm-week and newspaper fixed effects (columns 1 and 2), firm-week and newspaper-industry fixed effects (columns 3 and 4), or firm-week and newspaper-firm fixed effects (columns 5 and 6). The impact of advertising on a firm's media coverage is also economically significant. Results in columns 1 and 2 suggest that spending an extra 100,000 USD on advertising within four weeks implies an increase of 11.4% in the number of articles published on the firm (column 1) and an increase of 22.29% in the number of words that all articles on a firm in a given newspaper-week comprise in the following week (column 2).

While one can argue that all news create publicity for a firm and can thus be considered as good news, we think it is still more plausible that firms are mainly interested in positive coverage and try to avoid negative coverage. Thus, we now turn to our analysis of the impact of advertising on article tone. With respect to the tone of newspaper articles, we also find a consistent pattern which is reported in Panel B. High advertising expenditures lead to a significantly lower fraction of negative words in articles subsequently published about the firm. At the same time, the fraction of positive words is significantly larger if advertising expenditures are high four weeks before an article is published. In statistical terms, the impact of advertising on the fraction of negative words is slightly stronger with a significance level of at least 5% across the different econometric specifications. We also find a significant impact of advertising on the fraction of positive words in an article. However, the effect is only statistically significant in the first two specifications where we include firm-week and newspaper fixed effects, or firm-week and newspaper-industry fixed effects, respectively. This

⁹Alternatively, we compute the sum of a firm's advertising expenditures in a given newspaper one week instead of four weeks before the newspaper publishes and article on the firm. Our results (not reported) are stable and even slightly stronger in economic terms.

is in line with earlier papers using textual analysis (Tetlock (2007), Loughran and McDonald (2011)). These papers generally find stronger effects for negative word lists than for positive word lists which might have to do with negations not taken into account appropriately in positive word lists.

In economic terms, results in columns (1) and (2) of Panel B suggest that spending an extra 100,000 USD on advertising within four weeks before the publication date of an article results in a reduction of negative words of 3.31%. At the same time, firms can achieve an increase in the fraction of positive words of 1.91%.

In Panel C, we replace the LMD tone measures by our two alternative media content measures. Results also show a consistent picture. We find that tone-adjusted media coverage is significantly larger for firms that spent more on advertising in the past. Specifically, articles on a given firm are longer and more positive after high advertising expenditures at a given newspaper. This result holds for both proxies of media coverage and all econometric specifications. Note that the estimates in columns 5 and 6 serve as a lower bound of the overall effect due to the restrictiveness of the specification. The inclusion of firm-newspaper fixed effects forces identification to come exclusively from time variation in advertising and tone within a firm-newspaper pair. Therefore, if a firm spends a similar amount on advertising in a given paper throughout the sample period, the estimate of the effect would be close to zero.

Taken together, results in Table 4 provide strong support for the view that firms can use advertising to influence the frequency, length and tone of articles that a newspaper publishes on the firm. Given that the largest fraction of newspaper profits are generated through advertising, there is a strong incentive for newspapers to keep and possibly extend their corporate advertising clientele. The corporate world seems to be aware of this incentive and, as a result, we observe that newspapers clearly report more frequently about their corporate advertising clients and tend to be biased positively towards these firms. In the next step, we explore the temporal dynamics of our main effect.

3.2 Temporal dynamics

There are two - not mutually exclusive, but equally worrisome - possible explanations for the advertising bias we document. First, newspapers might portray certain companies (too) positively in order to attract advertisements from those companies. This explanation suggests some kind of “anticipatory obedience” of newspaper journalists. Second, newspapers might draw a positively biased picture of the firms that already advertise in this newspaper because these firms put pressure on editors to get positive coverage and newspapers aim to keep these firms as advertising clients. Thus, the effect would be driven by direct “advertiser pressure”. To shed more light on these possibilities, we analyze the temporal dynamics of the relationship between advertising and news coverage. We implement a panel vector autoregressive (VAR) model to simultaneously relate advertising expenditures and news tone on leads and lags of the same as well as the other variable, respectively. If the “anticipatory obedience” channel is active, we would mainly expect an impact of lagged news tone on future advertising expenditures, if the “advertiser pressure” channel is active, we would mainly expect an impact of lagged advertising expenditures on future news tone.

Our VAR model follows the extension of standard vector autoregression models to the panel context by Holtz-Eakin, Newey, and Rosen (1988). It controls for firm-newspaper fixed effects and corrects the dynamic panel bias analyzed in Nickell (1981).¹⁰ For the sake of brevity, we only include one proxy for media coverage (number of articles), media tone (LMD⁻), and tone-adjusted coverage (MC2) in our analysis. Results are presented in Table 5.

— Please insert TABLE 5 approximately here —

¹⁰Nickell (1981) shows that the dynamic panel bias is inversely proportional to T. The length of our panel is T=732 weeks, so that one could argue that the bias should be small in our case. If the bias is negligible, it is possible to use the within-transformation to account for the firm-newspaper fixed effects. Using this approach does not change the results (not reported).

Results in columns (1) and (2) of Table 5 show that lagged advertising has a significantly positive impact on the current number of articles on a given firm. At the same time, the lagged number of articles on a firm has a significantly positive impact on current advertising dollars spent by this firm. These findings suggest that causality goes from past coverage to future advertising and at the same time from past advertising to future coverage. However, joint coefficient tests show that the impact of lagged advertising on current media coverage is much stronger (F-stat=69.52) than the impact of lagged media coverage on current advertising expenditures (F-stat=25.43).

With respect to media tone, results in columns (3) and (4) of Table 5 show that only past advertising expenditures have a significant impact on the tone of a future newspaper report (F-stat=5.03), while lagged media tone has no significant impact on future advertising expenditures (F-stat=1.21). This pattern is consistent with the notion that high advertising expenditures lead to a less negative tone of newspaper articles on the firm, but a less negative tone does not attract higher advertising expenditures in the future. Results in columns (5) and (6) portray a similar picture. While lagged advertising expenditures have a significant impact on future tone-adjusted media coverage (F-stat=7.36) we find no significant impact of lagged tone-adjusted media coverage on future advertising expenditures (F-stat=0.94).

Taken together, the results in this section suggest that the “advertiser pressure” channel is much stronger than the “anticipatory obedience” channel for media tone and tone-adjusted media coverage. That is, past advertising expenditures have a significant impact on how newspapers write about their advertising clients in the future. With respect to the frequency of media coverage, we can not entirely rule out “anticipatory obedience” as an additional explanation. However, the impact of lagged advertising on future media coverage is still stronger than vice versa.

3.3 National vs. local newspapers

Gurun and Butler (2012) provide some indirect evidence that local newspapers report about local firms in a biased way and argue that this might be due to advertising of local firms. They find no evidence for an impact of firm advertising budgets in national newspapers on the news tone about those firms in the lead paragraph of articles in the Wall Street Journal.¹¹ However, due to data limitations, they can not analyze advertising expenditures in individual newspapers and the link to article tone in these papers.

The structure of our data allows us to re-examine differences between local and national newspapers in more detail and based on a much more comprehensive dataset including all four large national newspapers. Specifically, we can relate firm-level advertising expenditures at individual newspapers to media coverage of firms in this newspaper.

To investigate which individual newspapers are subject to advertising bias, we rerun our main regression for sub-samples of local and national newspapers. National newspapers are defined in a standard way as those with the highest circulation and that are distributed nationwide (i.e. New York Times, Wall Street Journal, USA Today, and Washington Post). All other newspapers in our sample are defined as local newspapers (see Appendix 5.1). Results are presented in Panel A of Table 6. The regression includes newspaper fixed effects as well as firm-week fixed effects.¹²

— Please insert TABLE 6 approximately here —

Results in Panel A show that lagged advertising expenditures have a significant impact on advertising bias in both, local as well as national newspapers. This result holds for the level of media coverage, the tone of the articles, as well as the tone-adjusted media coverage

¹¹Similarly, Reuter and Zitzewitz (2006) find that mutual fund recommendations are correlated with past advertising in three personal finance journals but neither in the New York Times, nor in the Wall Street Journal.

¹²Due to the small number of newspapers, particularly in the national newspapers subsample, we can not implement the strictest specification with combined newspaper-firm fixed effects.

measure.¹³ We find that they are stronger for local as compared to national newspapers: A 100,000 USD increase in advertising spending leads to a 13.79% (5.69%) increase in the number of articles in local (national) newspapers. Furthermore, a 100,000 USD increase in advertising spending leads to a 4.69% (3.18%) reduction in the fraction of negative words in articles published in local (national) newspapers.

In the next step, we estimate our main regression (column (1) in Table 4) with one of the media coverage variables as dependent variable. We then interact advertising expenditures with a vector of 41 dummy variables indicating each newspapers in our sample. This allows us to test for the impact of lagged advertising on future media coverage of advertising corporate clients for each of the newspapers individually. We report results on the combined coefficients of advertising and the interaction terms of the four national newspapers in Panel B. We find that lagged advertising expenditures have a significant impact on the number of articles published on advertising corporate clients for all national newspapers in our sample. With respect to the tone of the article and our tone-adjusted media coverage measures, we find a significant impact for the New York Times as well as USA Today. Advertising bias is strongest for USA Today. We do not find a significant impact for the Wall Street Journal and the Washington Post. Joint F-tests on the national newspapers' combined impact on the relation between past advertising and future media coverage support this finding. Results are reported in Panel C. Consistent with the results from Panel B, we find that the number of articles on an advertising corporate client is significantly related to this client's past advertising expenditures for all combinations of national newspapers. Regarding the tone of an article, we do not find a significant joint impact of the Wall Street Journal and Washington Post, while all other combinations of national newspapers yield significant results. The same result is observed for our tone adjusted media coverage measure.

¹³Our results (not reported) also hold if we include the number of words, the LMD⁺ tone measure, and the MC1 measure, respectively.

Taken together, while local newspapers show a somewhat stronger advertising bias than national newspapers, our results suggest that even national newspapers are not immune to advertising pressure from their corporate clients.

4 Advertising bias around corporate news events

In the final step, we analyze how exactly advertising bias manifests. To investigate this question in more detail, we define two news events that usually trigger a lot of investor attention at capital markets: earnings announcements (Section 4.1) and days with extreme stock returns (Section 4.2).

4.1 Earnings announcements

Earnings announcements are capital market events that generally trigger a lot of attention among investors (Aharony and Swary (1980)). There is a vast literature showing that stock markets react strongly upon the non-anticipated component of earnings announcements (for an overview, see Kothari (2001)). For example, Peress (2008) finds that announcements with more media coverage generate a stronger price and trading volume reaction at the announcement and less subsequent drift. Thus, earnings announcements constitute an information event that is particularly important for a firm. Media coverage of earnings announcements can largely amplify a positive or negative investor reaction to the announcement. Earnings announcements are scheduled news events that are easily observable and whose objective information content can easily be measured. Thus, they are well suited to further investigate how exactly newspapers bias reports about their corporate advertising clients around these events, particularly whether advertising bias differs after good or bad news.

We use I/B/E/S analyst forecasts to compute quarterly earnings surprises for the firms in our sample. Specifically, we follow the previous literature on earnings announcements (DellaVigna and Pollet (2009)) and subtract the median I/B/E/S analyst forecast in the 30

days prior to the announcement from a firm’s announced earnings and divide this difference by the stock price 5 days prior to the announcement. Then, we sort firms into quintiles according to their earnings surprise (SUE). Summary statistics on our media coverage and advertising variables for the bottom and top earnings surprise quintile, respectively, are presented in Panel A of Table 7. While our media coverage variables are computed over two days after an earnings announcement, advertising expenditures refer to a time period of 30 days before an earnings announcement.

— Please insert TABLE 7 approximately here —

Results in Panel A show that there are fewer articles on a firm if it belongs to the bottom quintile of earnings surprises in the preceding calendar month (1.36 articles) than if the firm belongs to the top quintile of earnings surprises (1.39 articles). There are slightly more negative words in an article covering a firm in the bottom earnings surprise quintile (2.58%), than in an article covering a firm in the top earnings quintile (2.25%). A similar result obtains for our tone-adjusted media coverage measure. Advertising expenditures 30 days before an earnings announcement are higher if a firm belongs to the top earnings quintile than if it belongs to the bottom earnings quintile.

In the next step, we investigate whether newspapers cover earnings announcements differently depending on whether the announcement firm belongs to its corporate advertising clients or has no business ties with the newspaper. We split our data into subsamples conditional on earnings surprise quintiles and re-run our main regression (column (1) in Table 4) with one of the media coverage variables as dependent variable. Results are presented in Table 8.

— Please insert TABLE 8 approximately here —

We find a significant impact of past advertising expenditures on the number of articles written about firms in the top and bottom earnings surprise quintile, respectively. One

might have expected that newspapers just refrain from reporting about bad news events of its advertising clients. At least in the context of earnings announcements, we find no evidence of such “selective omission”. More importantly, regarding the tone of an article, we find that articles are significantly less negative for firms in the bottom earnings surprise quintile the more this firm advertised in a given newspaper 30 days before its earnings announcement. Results (not reported) for firms belonging to quintiles 2 to 4 are not statistically significant except for a marginally significant coefficient for quintile 3 (t-stat -1.76). There is also no significant impact for firms with very good earnings news, i.e. firms in the top quintile. We also observe a significant impact of past advertising only on firms in the bottom earnings quintile for our tone-adjusted media coverage variable.¹⁴

Results in Table 8 show that advertising bias is strongest for firms in the bottom earnings surprise quintile. Thus, newspapers mainly bias their coverage of bad news in favor of their corporate advertising clients, while reports on good news seem to be unbiased.

4.2 Extreme stock returns

An alternative way to define corporate news events is suggested by Barber and Odean (2008). They use stock returns to measure whether investors are paying attention to a firm on a given day. This circumvents the challenge of defining specific news events and measuring their importance for a given firm. We follow this approach and sort firms according to their excess stock returns relative to the CRSP value-weighted index in the previous calendar month. We then classify all observations at the bottom 1% and the top 99% of the excess return distribution as potentially important information events. Summary statistics on these firms are reported in Panel B of Table 7. We find that there are on average 1.45 articles on firms that belong to the bottom percentile of the excess return distribution, while there are 1.41 articles on firms that belong to the top percentile of the excess return distribution.

¹⁴We obtain similar results if we replace newspaper fixed effects by newspaper-industry fixed effects, while results are not significant anymore if we include newspaper-firm fixed effects.

Not surprisingly and in line with our results on earnings surprise quintiles in Panel A, the fraction of negative words is higher for firms in the bottom percentile of the return distribution (2.82) than for firms in the top percentile (2.06).

In the next step, we run regressions based on subsamples of firms in the bottom and top return distribution percentile. Results are reported in Panel B of Table 8.

— Please insert TABLE 8 approximately here —

We find that newspapers write significantly more articles about a corporate advertising clients in the top but also in the bottom return distribution percentile. This pattern confirms our findings from above that there is no evidence for selective omission. The tone of an article is significantly less negative for firms in the bottom return distribution percentile, a result that also holds for our tone-adjusted media coverage variable, while this is not true for firms in the top return distribution percentile.

Taken together, the results in Table 8 portray a consistent picture independent of whether we define a corporate news event based on earnings announcements (Panel A) or extreme stock returns (Panel B). Advertising bias is strongest for firm-newspaper relations around negative news events of a firm. Advertising thus seems to allow firms to hedge against negative news coverage around bad corporate events and prevent an amplification effect of bad news due to increased negative media coverage.

5 Conclusion

This paper investigates whether an advertising bias exists in the US newspaper industry. Our results provide support for the view that economic incentives arising from newspapers' revenue generating process indeed bias their reports. Newspapers report more frequently and more favorably about their corporate advertising clients. This effect is more pronounced

after bad corporate news events than after good corporate news events. Media coverage of such an event in a newspaper is less negative if the firm advertised in this newspaper before the news event. Newspaper advertising thus seems to offer additional benefits for a firm beyond attracting new customers for their products: It can hedge a firm against bad media coverage if it has to announce bad news.

Overall, our results cast serious doubts on the independence of the press from the corporate world. Particularly local newspapers seem to be influenced by their corporate environment. We also find an impact of advertising bias on national newspapers. However, advertising bias is weaker for national as compared to local newspapers.

Previous papers have argued that the rise of advertising in the nineteenth-century successfully created a press that is independent from political influence, because profits could then be generated from advertising revenues (Petrova (2011)). Our paper implies that regulatory policies might be needed to fully establish an independent press that conveys unbiased and accurate information to its readers. Specifically, our results suggest that it might make sense to require a stricter separation between the advertising department and the editorial department of a newspaper (similar to Chinese walls in investment banks between the corporate-advisory department and the brokerage department).

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Table 1: Summary statistics

This table gives summary statistics on the media and advertising database. Article # is the number of articles published on a firm in a newspaper-week. Word # is the number of words in these articles. LMD^- and LMD^+ are measured by Loughran and McDonald's negative and positive word lists, respectively: $LMD^i = 100 * \frac{wordinlist\#^i}{word\#}$, where $i = -, +$. Media Content (MC) 1 is calculated as $1/(LMD^- + 1) * \log(word\#)$ and Media Content (MC) 2 is calculated as $-1 * (LMD^- - \overline{LMD^-}) * \log(word\#)$, where $\overline{LMD^-}$ is the overall mean. 1 (4)-week Ads is the sum of advertising in the previous 1 (4) weeks. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-week. Panel A reports statistics conditional on at least one article being published within a firm-newspaper-week. Panel B includes all observations.

	Mean	Median	SD	75%ile	25%ile	N
Panel A: Conditional on at least one article						
1-week Ads (\$'000)	21.04	0	91.16	0	0	960,109
4-week Ads (\$'000)	84.10	0	334.42	8	0	955,394
Article #	1.55	1	1.41	2	1	961,529
Word # ('000)	0.79	1	1.03	1	0	961,529
Tone (LMD^-)	1.87	2	1.58	3	1	961,529
Tone (LMD^+)	0.70	1	0.63	1	0	961,529
Media content (MC) 1	2.80	3	1.38	4	2	961,529
Media content (MC) 2	0.01	2	9.03	7	-5	961,529
Panel B: All observations						
1-week Ads (\$'000)	2.03	0	24.07	0	0	36,008,522
4-week Ads (\$'000)	8.14	0	87.18	0	0	35,837,885
Article #	0.04	0	0.34	0	0	36,065,394
Word # ('000)	0.02	0	0.21	0	0	36,065,394
Media content (MC) 1	0.07	0	0.50	0	0	36,065,394
Media content (MC) 2	-0.01	0	1.48	0	0	36,065,394

Table 2: Conditional mean comparisons

This table reports results from mean comparison tests over advertising status. A firm is considered an advertiser in a given newspaper if its lagged 1 (4)-week advertising is > 0 in Panel A (B). Article # is the number of articles published on a firm in a newspaper-week. Word # is the number of words in these articles. LMD^- and LMD^+ are measured by Loughran and McDonald's negative and positive word lists, respectively: $LMD^i = 100 * \frac{wordinlist\#^i}{word\#}$, where $i = -, +$. Media Content (MC) 1 is calculated as $1/(LMD^- + 1) * \log(word\#)$ and Media Content (MC) 2 is calculated as $-1*(LMD^- - \overline{LMD^-}) * \log(word\#)$, where $\overline{LMD^-}$ is the overall mean. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-week, conditional on at least one article being published. Standard errors are clustered by firm.

Measure	Advertiser	Non-Advertiser	Difference	t-stat
Panel A: 1-week Advertising				
Article #	1.91	1.45	0.46	5.14
Word #	1,034.22	727.98	306.23	5.61
Tone (LMD^-)	1.78	1.89	-0.11	-3.12
Tone (LMD^+)	0.73	0.70	0.03	2.52
MC1	2.90	2.77	0.13	3.92
MC2	0.58	-0.14	0.71	3.05
Panel B: 4-week Advertising				
Article #	1.87	1.42	0.45	6.01
Word #	1,000.94	708.67	292.27	6.40
Tone (LMD^-)	1.80	1.90	-0.10	-2.97
Tone (LMD^+)	0.72	0.69	0.03	2.79
MC1	2.88	2.76	0.12	3.81
MC2	0.45	-0.17	0.62	2.89

Table 3: Correlations

This table shows correlations between the main dependent and independent variables. $\text{Log}(\text{Article \#})$ is the log of the number of articles published on a firm in a newspaper-week. $\text{Log}(\text{Word \#})$ is the log of the number of words in these articles. LMD^- and LMD^+ are measured by Loughran and McDonald's negative and positive word lists, respectively: $\text{LMD}^i = 100 * \frac{\text{wordinlist}\#^i}{\text{word}\#}$, where $i = -, +$. Media Content (MC) 1 is calculated as $1/(\text{LMD}^- + 1) * \log(\text{word}\#)$ and Media Content (MC) 2 is calculated as $-1 * (\text{LMD}^- - \overline{\text{LMD}^-}) * \log(\text{word}\#)$, where $\overline{\text{LMD}^-}$ is the overall mean. $\text{Log}(1 \text{ (4)-week Ads})$ is the log of the sum of advertising in the previous 1 (4) weeks. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-week, conditional on at least one article being published. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log(Article #)	Log(Word #)	LMD ⁻	LMD ⁺	MC1	MC2	Log(1-week Ads)	Log(4-week Ads)
Log(Article #)	1.0000							
Log(Word #)	0.5412 ***	1.0000						
LMD ⁻	0.0419 ***	-0.0085 ***	1.0000					
LMD ⁺	0.0142 ***	0.1188 ***	-0.1317 ***	1.0000				
MC1	0.0223 ***	0.1179 ***	-0.8416 ***	0.0955 ***	1.0000			
MC2	-0.0509 ***	0.0055 ***	-0.9775 ***	0.1368 ***	0.8582 ***	1.0000		
Log(1-week Ads)	0.1906 ***	0.1218 ***	-0.0199 ***	0.0192 ***	0.0287 ***	0.0227 ***	1.0000	
Log(4-week Ads)	0.2072 ***	0.1247 ***	-0.0190 ***	0.0208 ***	0.0282 ***	0.0216 ***	0.8941 ***	1.0000

Table 4: Media coverage, tone and content: Fixed effects analysis

This table reports the result of regressing media coverage (Panel A), tone (Panel B) and content (Panel C) on lagged 4-week advertising. Art. # is the log of the number of articles published on a firm in a newspaper-week. Word # is the log of the number of words in these articles. LMD^- and LMD^+ are measured by Loughran and McDonald's negative and positive word lists, respectively: $LMD^i = 100 * \frac{wordinlist\#^i}{word\#}$, where $i = -, +$. Media Content (MC) 1 is calculated as $1/(LMD^- + 1) * \log(word\#)$ and Media Content (MC) 2 is calculated as $-1 * (LMD^- - \overline{LMD^-}) * \log(word\#)$, where $\overline{LMD^-}$ is the overall mean. Firm-week, newspaper-SIC2 and newspaper-firm are interacted fixed effects. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-week, conditional on at least one article being published. t statistics are provided in parentheses. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Media coverage						
	Art. # (1)	Word # (2)	Art. # (3)	Word # (4)	Art. # (5)	Word # (6)
Log(4-week Ads)	0.0234*** (8.39)	0.0436*** (9.10)	0.0155*** (4.77)	0.0297*** (5.40)	0.0030** (2.46)	0.0038* (1.90)
Firm-week FE	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper FE	Yes	Yes	-	-	-	-
Newspaper-SIC2 FE	-	-	Yes	Yes	-	-
Newspaper-firm FE	-	-	-	-	Yes	Yes
No. obs.	955,394	955,394	610,622	610,622	955,394	955,394
R ²	0.386	0.647	0.475	0.691	0.556	0.718

Panel B: Media tone						
	LMD ⁻ (1)	LMD ⁺ (2)	LMD ⁻ (3)	LMD ⁺ (4)	LMD ⁻ (5)	LMD ⁺ (6)
Log(4-week Ads)	-0.0134*** (-4.63)	0.0029*** (2.93)	-0.0125*** (3.00)	0.0035*** (2.82)	-0.0066** (-2.38)	-0.0001 (-0.10)
Firm-week FE	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper FE	Yes	Yes	-	-	-	-
Newspaper-SIC2 FE	-	-	Yes	Yes	-	-
Newspaper-firm FE	-	-	-	-	Yes	Yes
No. obs.	955,394	955,394	610,622	610,622	955,394	955,394
R ²	0.531	0.455	0.549	0.487	0.566	0.492

Panel C: Media content						
	MC1 (1)	MC2 (2)	MC1 (3)	MC2 (4)	MC1 (5)	MC2 (6)
Log(4-week Ads)	0.0158*** (7.14)	0.0806*** (4.79)	0.0122*** (3.37)	0.0668** (2.43)	0.0050** (2.09)	0.0320** (2.03)
Firm-week FE	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper FE	Yes	Yes	-	-	-	-
Newspaper-SIC2 FE	-	-	Yes	Yes	-	-
Newspaper-firm FE	-	-	-	-	Yes	Yes
No. obs.	955,394	955,394	610,622	610,622	955,394	955,394
R ²	0.530	0.529	0.552	0.546	0.570	0.564

Table 5: Temporal dynamics

This table reports the results of a panel VAR with advertising dollars and media measures as the components. The components of the VAR are weekly advertising as well as media coverage (VAR 1), tone (VAR 2) and content (VAR 3). $\text{Log}(\text{Article } \#)$ is the log of the number of articles published on a firm in a newspaper-week. LMD^- is measured by Loughran and McDonald's negative word list and demeaned: $\text{LMD}^- = 100 * \frac{\text{negativeword}\#}{\text{word}\#} - \overline{\text{LMD}^-}$, where $\overline{\text{LMD}^-}$ is the overall mean and observations with no articles are set to 0. Media Content (MC) 2 is calculated as $-1 * (\text{LMD}^- - \overline{\text{LMD}^-}) * \text{log}(\text{word}\#)$. The model is estimated following the extension of standard vector autoregression to the panel context by Holtz-Eakin, Newey, and Rosen (1988). The given F-statistics and p-values are those from a joint test that the given coefficients are equal to 0. Media refers to Article # in columns 1 and 2, LMD^- in columns 3 and 4 and MC2 in columns 5 and 6. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-week, including observations with no articles being published. Standard errors are adjusted for heteroskedasticity. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	VAR1: Media coverage		VAR2: Media tone		VAR3: Media content	
	Log(Article #) (1)	Log(Ads) (2)	LMD^- (3)	Log(Ads) (4)	MC2 (5)	Log(Ads) (6)
Log(Article #)						
Lag 1	0.1241***	0.0087***				
Lag 2	0.0871***	0.0031***				
Lag 3	0.0748***	0.0053***				
Lag 4	0.0698***	0.0040***				
Lag 5	0.0662***	0.0042***				
Lag 6	0.0649***	-0.0002				
LMD^-						
Lag 1			0.0381***	-0.0006		
Lag 2			0.0258***	0.0005		
Lag 3			0.0224***	0.0005		
Lag 4			0.0203***	0.0012**		
Lag 5			0.0196***	0.0003		
Lag 6			0.0172***	-0.0001		
MC_2						
Lag 1					0.0600***	0.0001
Lag 2					0.0422***	-0.0000
Lag 3					0.0370***	0.0000
Lag 4					0.0339***	-0.0001*
Lag 5					0.0327***	-0.0001
Lag 6					0.0298***	-0.0001
Log(Ads)						
Lag 1	0.0014***	0.2736***	-0.0009***	0.2736***	0.0060***	0.2736***
Lag 2	0.0001	0.1870***	-0.0007**	0.1870***	0.0046***	0.1870***
Lag 3	0.0002	0.0647***	-0.0002	0.0647***	0.0013	0.0647***
Lag 4	0.0005***	0.1053***	0.0005	0.1053***	-0.0025	0.1053***
Lag 5	0.0007***	0.0524***	0.0001	0.0524***	0.0001	0.0524***
Lag 6	0.0006***	0.0522***	-0.0004	0.0522***	0.0026	0.0522***
N	35,640,757	35,640,757	35,640,757	35,640,757	35,640,757	35,640,757
F-Stat (Media=0)	24,103.01	25.43	1,247.73	1.21	3,734.30	0.94
p-value (Media=0)	0.00	0.00	0.00	0.30	0.00	0.46
F-Stat (Ads=0)	69.52	125543.48	5.03	125434.09	7.36	125428.65
p-value (Ads=0)	0.00	0.00	0.00	0.00	0.00	0.00

Table 6: Local and national newspapers

This table examines the relationship between advertising and media reporting for local and national newspapers. Panel A reports the results of regressing media coverage, tone and content on lagged 4-week advertising separately for local and national newspapers. National newspapers are Wall Street Journal, New York Times, USA Today and the Washington Post. Panel B reports the combined coefficients on the four national newspapers from the following regression (run using all 41 newspapers): $LMD^- = \alpha_0 + \alpha_1 * Ads + \beta * Ads * \mathbf{Paper} + \mathbf{Paper}$. \mathbf{Paper} is a 1x41 vector of newspaper dummies. Panel C reports F-Tests on the national newspapers' combined coefficients ($\alpha_1 + \beta$) from this regression. $\text{Log}(\text{Article \#})$ is the log of the number of articles published on a firm in a newspaper-week. LMD^- is measured by Loughran and McDonald's negative word list: $LMD^- = 100 * \frac{\text{negative word\#}}{\text{word\#}}$. Media Content (MC) 2 is calculated as $-1 * (LMD^- - \overline{LMD^-}) * \log(\text{word\#})$, where $\overline{LMD^-}$ is the overall mean. Firm-week is an interacted fixed effect. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-week, conditional on at least one article being published. t statistics are provided in parentheses. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Regressions on subsamples						
	Log(Article #)		LMD ⁻		MC2	
	Local	National	Local	National	Local	National
Log(4-week Ads)	0.0280*** (6.69)	0.0120*** (4.04)	-0.0186*** (-5.36)	-0.0139*** (-2.72)	0.1160*** (5.00)	0.0971*** (3.77)
Firm-week FEs	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper FEs	Yes	Yes	Yes	Yes	Yes	Yes
No. obs.	748,208	207,186	748,208	207,185	748,208	207,186
R ²	0.386	0.721	0.551	0.786	0.550	0.775
Panel B: Regression using advertising-newspaper interactions, combined coefficients						
	Log(Article #)		LMD ⁻		MC2	
	$\alpha_1 + \beta$	p-value	$\alpha_1 + \beta$	p-value	$\alpha_1 + \beta$	p-value
New York Times	0.0325	0.00	-0.0129	0.00	0.0749	0.01
USA Today	0.0159	0.00	-0.0194	0.00	0.1185	0.00
Wall Street Journal	0.0204	0.00	-0.0090	0.22	-0.0013	0.97
Washington Post	0.0300	0.00	-0.0067	0.34	0.0474	0.31
Panel C: Regression using advertising-outlet interactions, F-Tests						
	Log(Article #)		LMD ⁻		MC2	
	F-Stat	p-value	F-Stat	p-value	F-Stat	p-value
All nationals:	14.43	0.00	5.27	0.00	4.99	0.00
NYT, WSJ, WP:	17.44	0.00	4.24	0.01	4.08	0.01
USAT, WSJ, WP:	15.67	0.00	5.02	0.00	4.18	0.01
NYT, USAT, WP:	19.01	0.00	6.99	0.00	6.34	0.00
NYT, USAT, WSJ:	14.77	0.00	5.92	0.00	5.28	0.00
WSJ and WP:	20.61	0.00	1.32	0.27	0.52	0.59

Table 7: Media and corporate events: Summary statistics

This table gives summary statistics by earnings surprise quintiles in Panel A and extreme stock returns in Panel B. In Panel A, quintile cutoffs are based on the distribution of earnings surprises in the preceding calendar month. In Panel B, we consider an excess return (in excess of CRSP value-weighted index) to be extreme if it is in the 1st or 99th percentile of the excess return distribution of the preceding calendar month. Standardized earnings surprise (SUE)] SUE is defined as $\frac{A_q - E_q}{P_q}$, where A_q is the actual earnings, E_q the median analyst forecast in the 30 days prior to the announcement from I/B/E/S, and P_q the stock price 5 days prior to the announcement from CRSP (DellaVigna and Pollet 2009). Article # is the number of articles published on a firm in a newspaper-week. LMD^- is measured by Loughran and McDonald's negative word list: $LMD^- = 100 * \frac{\text{negativeword\#}}{\text{word\#}}$. Media Content (MC) 2 is calculated as $-1 * (LMD^- - \overline{LMD^-}) * \log(\text{word\#})$, where $\overline{LMD^-}$ is the overall mean. Article #, LMD^- and MC2 are based on days zero to two relative to an earnings announcement or extreme return event. 30-day Ads is the sum of advertising over the 30 days prior to the event. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-earnings surprise day in Panel A and the firm-newspaper-extreme return day in Panel B, conditional on at least one article being published.

Panel A: Earnings surprises						
	Mean	Median	SD	25%ile	75%ile	N
1 st Quintile						
SUE	-3.81	0	28.80	-1	0	12,022
Article #	1.36	1	0.98	1	1	12,022
LMD^-	2.58	2	1.99	1	4	12,022
MC2	-3.21	-2	9.77	-9	5	12,022
30-day Ads	71.18	0	301.46	0	4	12,022
5 th Quintile						
SUE	2.38	1	23.92	0	1	11,858
Article #	1.39	1	1.15	1	1	11,858
LMD^-	2.25	2	1.83	1	3	11,858
MC2	-1.42	0	9.07	-7	6	11,858
30-day Ads	96.90	0	381.90	0	12	11,858

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Panel B: Extreme stock returns						
	Mean	Median	SD	25%ile	75%ile	N
1 st percentile						
Ex. Return [%]	-19.26	-16	11.87	-23	-12	19,672
Article #	1.45	1	1.37	1	1	19,672
LMD ⁻	2.82	3	1.96	2	4	19,672
MC2	-3.04	-2	9.71	-9	4	19,672
30-day Ads	38.92	0	199.23	0	0	19,672
99 th percentile						
Ex. Return [%]	23.59	19	18.14	13	28	17,036
Article #	1.41	1	1.25	1	1	17,036
LMD ⁻	2.06	2	1.69	1	3	17,036
MC2	1.05	3	8.85	-4	8	17,036
30-day Ads	32.20	0	177.08	0	0	17,036

Table 8: Media and corporate events: Fixed effects analysis

This table reports the results of regressing media coverage, tone and content on lagged 30-day advertising within subsamples based on financial market events. Panel A considers earnings announcements. Quintile cutoffs are based on the distribution of earnings surprises in the preceding calendar month. Panel B considers extreme stock returns, where extreme returns are defined using the 1st and 99th percentiles from the preceding calendar month. $\text{Log}(\text{Article } \#)$ is the log of the number of articles published on a firm in a newspaper-week. LMD^- is measured by Loughran and McDonald's negative word list: $\text{LMD}^- = 100 * \frac{\text{negativeword}\#}{\text{word}\#}$. Media Content (MC) 2 is calculated as $-1 * (\text{LMD}^- - \overline{\text{LMD}^-}) * \log(\text{word}\#)$, where $\overline{\text{LMD}^-}$ is the overall mean. $\text{Log}(\text{Article } \#)$, LMD^- and MC2 are based on days zero to two relative to an earnings announcement or extreme return event. $\text{Log}(\text{30-day Ads})$ is the log of the sum of advertising over the 30 days prior to the event. Further variable definitions can be found in Appendix 5.3. The unit of observation is the firm-newspaper-earnings surprise day in Panel A and the firm-newspaper-extreme return day in Panel B, conditional on at least one article being published. t statistics are provided in parentheses. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Earnings surprise quintiles						
	Log(Article #)		LMD ⁻		MC2	
	1 st	5 th	1 st	5 th	1 st	5 th
Log(30-day Ads)	0.0175*** (6.20)	0.0179*** (5.70)	-0.0444*** (-2.80)	0.0043 (0.24)	0.1938*** (2.85)	-0.0340 (-0.41)
Firm-event FEs	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper FEs	Yes	Yes	Yes	Yes	Yes	Yes
No. obs.	12,022	11,858	12,022	11,858	12,022	11,858
R ²	0.370	0.364	0.539	0.514	0.541	0.515
Panel B: Extreme stock returns						
	Log(Article #)		LMD ⁻		MC2	
	1 st	99 th	1 st	99 th	1 st	99 th
Log(30-day Ads)	0.0290*** (8.32)	0.0256*** (5.97)	-0.0275** (-2.54)	-0.0148 (-1.42)	0.1088** (2.20)	0.1000* (1.91)
Firm-event FEs	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper FEs	Yes	Yes	Yes	Yes	Yes	Yes
No. obs.	19,672	17,036	19,672	17,036	19,672	17,036
R ²	0.440	0.440	0.605	0.619	0.606	0.623

Appendices

5.1 Newspapers used in our analysis

arkansas democrat gazette	norfolk virginian pilot
atlanta journal constitution	oklahoma oklahoman
austin american statesman	palm beach post
bergen record	philadelphia inquirer
birmingham news	pittsburgh post gazette
boston herald	portland oregonian
buffalo news	providence journal
chicago sun times	richmond times dispatch
cleveland plain dealer	sacramento bee
dallas morning news	salt lake tribune
dayton daily news	san antonio express news
denver post	san francisco chronicle
fresno bee	san jose mercury news
houston chronicle	seattle post intelligencer
las vegas review journal	st louis post dispatch
minneapolis star tribune	tampa tribune
new orleans times picayune	tulsa world
new york daily news	usa today
new york post	wall street journal
new york times	washington post
newark star ledger	

5.2 Description of data cleansing process

To merge our advertising data with newspaper articles from LexisNexis, we follow the procedure applied by Fang and Peress (2009). LexisNexis provides company identifiers for each article. In addition, a “relevance score” indicates how much a given article is related to a specific firm. This score is based on criteria such as the keyword’s frequency, and its weight and location within the document. According to LexisNexis, an article is classified as a “major reference” with respect to a given firm, if its relevance score is at least 85%.¹⁵ We manually checked 1,000 articles and find that a relevance score of 80% still classifies articles that are mainly about a given firm. To maintain a reasonably large sample size for identification purposes, we therefore keep all articles on a firm that have a relevance score of at least 80% in our sample.

In the next step, we drop all sponsored articles. These articles are labeled in LexisNexis within its “Document_type” variable. In addition, all duplicate articles are deleted from the sample as well. We identify duplicates as follows. First, articles that are identical with respect to the company covered, newspaper, day of the week and number of words are classified as duplicates. Out of two duplicates, we keep the one that was first added to the LexisNexis database (Variable “Load Date” allows us to identify the exact date when an article was added to the database). Second, articles that are still identical with respect to the company covered, newspaper, day of the week, and headline are classified as duplicated. These duplicates frequently consist in an online version and a print version of the same article. We drop online versions of these duplicates from our sample if there is also a print version of the same article. If there are still duplicates left with respect to company covered, newspaper, day of the week, and headline, we keep the longest article with the earliest load date.

Finally, we aggregate articles on the firm-newspaper-week level by computing the mean tone and the sum of all articles.

¹⁵See http://wiki.lexisnexis.com/academic/index.php?title=Relevance_Score

5.3 Brief definitions and sources of main variables

Advertising Advertising spent in a specific newspaper by a firm. Data is obtained from Kantar Media Strategy. $\text{Log}(1\text{ (4)-week Ads})$ is the natural log of the sum of advertising expenditures within a firm-newspaper pair over the preceding 1 (4) weeks. $\text{Log}(30\text{-day Ads})$ is the natural log of the sum of advertising expenditures within a firm-newspaper pair over the preceding 30 days.

Article # The number of articles written about a company in a newspaper.

Excess Return The excess return of firm i at time t is defined as its stock return in excess of the CRSP value-weighted index: $ExcessReturn_{i,t} = Return_{i,t} - CRSP_{VW}$.

LMD⁻ Negative article tone as measured by the negative word list developed in Loughran and McDonald (2011): $LMD^- = 100 * \frac{negativeword\#}{totalword\#}$.

LMD⁺ Positive article tone as measured by the positive word list developed in Loughran and McDonald (2011): $LMD^+ = 100 * \frac{positiveword\#}{totalword\#}$.

Media Content 1 Media Content (MC) 1 is calculated as $1/(LMD^- + 1) * \log(word\#)$. It is increasing in article length and decreasing in negativity. Higher values indicate more favorable media coverage.

Media Content 2 Media Content (MC) 2 is calculated as $-1 * (LMD^- - \overline{LMD^-}) * \log(word\#)$, where $\overline{LMD^-}$ is the overall mean of LMD⁻. MC2 is decreasing in negativity and increasing in article length only for less negative than average news, otherwise it is decreasing. Higher values indicate more favorable media coverage.

Standardized earnings surprise (SUE) SUE is defined as $\frac{A_q - E_q}{P_q}$, where A_q is the actual earnings, E_q the median analyst forecast in the 30 days prior to the announcement from I/B/E/S, and P_q the stock price 5 days prior to the announcement from CRSP (DellaVigna and Pollet 2009).

Word # The number of words written about a company in a newspaper.