Is Investor Attention for Sale? The Role of Advertising in Financial Markets*

Joshua Madsen† Marina Niessner‡

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Abstract

Using detailed data on daily firm advertising activity and Google searches for firms' tickers, we find that ads for products and services attract investors' attention to financial information. We find that this increased attention has a temporary effect on stock prices. Weekend ads generate temporary negative returns for companies with positive returns in the prior week, but have no effect for companies with negative returns in the prior week. The increased attention and negative returns associated with weekend ads are consistent with investors exhibiting a disposition effect to sell their winning stocks but hold their losing stocks. In the second part of the paper we examine whether managers attempt to influence investors' attention via product market advertising. We find that firms temporarily increase weekly advertising in the three weeks around earnings announcements if the earnings surprise is positive, and some evidence that they decrease advertising if the earnings surprise is negative. Increased advertising over earnings announcement windows impacts financial markets and is associated with larger announcement returns relative to firms with similar earnings.

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†Carlson School of Management, University of Minnesota, jmmadsen@umn.edu

‡Yale School of Management, marina.niessner@yale.edu.

1 Introduction

Companies spend vast resources on advertising. In 2012 alone, companies spent approximately $165 billion on advertising, $34 billion of which went to print media.[1] Ads usually target consumers, but are also visible to current and potential investors. Prior research provides preliminary evidence that levels of advertising are correlated with annual returns and ownership structure (e.g. Grullon, Kanatas, and Weston (2004); Frieder and Subrahmanyam (2005); Fehle, Tsyplakov, and Zdorovtsov (2005); Chemmanur and Yan (2010); Lou (2014)). We build on this literature and use a novel data set of daily firm print advertisements to identify the causal effects from placing ads. We further find evidence that managers use advertising strategically to attract investors' attention.

We first examine whether advertising affects investor attention and stock prices. We find that print advertising days are associated with a 3% increase in daily Google searches for a firm's ticker (approximately the same effect as news coverage), and that this increase persists for two days. These tests provide initial evidence that product market advertising increases attention to financial markets (spillover effects). We further find that this increased attention has short-lived stock market implications and puts temporary downwards price pressure on past winners (stocks with a positive return in the prior week), but has no effect on past losers. These findings are consistent with the disposition effect, or tendency for investors to sell past winners and hold past losers.[2] Our analysis is among the first to provide causal evidence on the immediate financial market consequences of placing advertisements.

We next examine whether managers use ads to influence investors' attention around earnings announcement dates. We find that managers temporarily increase weekly advertising by 3% around positive earnings surprises, and some evidence that they decrease weekly advertising around negative surprises. These manipulations occur after the fiscal quarter has ended and only last 2-4 weeks, and are thus inconsistent with real earnings management or

[1] Source: eMarketer, Aug 2013

[2] See Shefrin and Statman (1985), Odean (1998), Frazzini (2006), and Barberis and Xiong (2009).

permanent changes in advertising budgets. Our evidence suggests that managers attempt to attract (minimize) investor attention when they disclose positive (negative) information. We further find that positive abnormal advertising activity on earnings announcement dates generates a temporary market overreaction to earnings surprises relative to firms with similar levels of earnings. These tests provide further evidence of advertising spillover effects on financial markets.

Attention is a scarce resource (Kahneman (1973)) and advertisements are designed to attract attention, particularly from consumers. However, a company's customers are also more likely to invest in that company's stock (Keloharju, Knüpfer, and Linnainmaa (2012)). This overlap in customer and investor groups, combined with investors' attention constraints, suggests that product market advertising can attract attention to a firm's financial information. Specifically, ads for a company's products or services may trigger investors to seek information about the stock's recent performance.

To test our hypothesis, we use a novel data set of companies' daily print advertisements from MediaRadar for the years 2007 to 2013. MediaRadar regularly scans over 400 daily and weekly print publications and identifies key attributes of each advertisement, including ad size and estimated cost. MediaRadar also classifies each publication by its primary audience (e.g., business, auto, luxury). After merging this data with stock information, we concentrate our analysis on 971 publicly traded companies, for which we have 569,957 ads in 39 daily and 419 weekly publications.

In prior research, tests for spillover effects of annual or monthly advertising expenditures on financial markets usually suffer from concerns that reverse causality (e.g., increased advertising due to contemporaneous positive returns) or omitted variables (e.g, increased advertising due to a product launch) influence the results. At annual, monthly and even weekly intervals, an exogenous change in advertising levels is required to precisely identify causal effects on financial markets. Absent an exogenous shock, an unobserved variable, such as changing firm fundamentals, could influence both changes in advertising and changes in

investor attention or returns. Prior research thus primarily focuses on associations between advertising levels and financial market variables such as ownership structure and annual returns.

An advantage of our data is that we know the exact date of all print advertisements which allows us to exploit variation in daily attention measures. This detailed data, combined with controls for firm's media coverage, allow us to identify the causal effects of placing an advertisement on financial markets. In particular, this micro data help mitigate concerns that omitted variables are responsible for our results. Although advertisements can coincide with product launches, including news stories as a control variable should help address concerns that these events influence our results. At the daily level, changes in firm fundamentals which coincide with days on which ads are printed are unlikely to explain the changes in investor attention or stock returns that we document. Furthermore, ads cannot be ordered the same day we measure investor attention, making it unlikely that firms are advertising in response to increased attention at the daily level (reverse causality).[3]

One potential drawback is that our data only capture print advertising. However, when we collapse our data to monthly frequencies, we find a significant correlation (ranging from 0.45 to 0.60) between our measures of print advertising and companies' monthly advertising expenditures (taken from Kantar Media's Ad$pender database). These monthly correlations suggest that print advertising is representative of companies' general advertising activity. Furthermore, according to the American Press Institute, 61% of US adults report reading a print newspaper or magazine over the previous week.[4] Also, according to a pan-European survey conducted by VTT, a Finnish research institute, 63% of people surveyed trust print advertising, whereas only 41% trust TV ads and 25% trust internet ads, suggesting that

[3] However, managers can still attempt to influence investor attention through strategic advertising, which is the focus of our subsequent tests.

[4] http://www.americanpressinstitute.org/publications/reports/survey-research/how-americans-get-news/

readers may pay more attention to print ads.[5] Finally, we believe that the benefits of having daily advertising data outweigh the downside of having only advertisements in print media.

For a sub-sample of 458 firms with available daily Google search data, we find that days with ads in a daily newspaper are associated with a 3% increase in Google searches for the company's stock ticker and that this increase persists for two days. We find no significant change in Google searches on the two days prior to the advertisement, suggesting that ads are responsible for this increased attention to financial information. As a benchmark, earnings announcements generate a 15% increase in Google searches for company tickers, suggesting that product ads attract approximately $\frac{1}{5}$th the financial attention of earnings news. These results are robust across multiple measures of advertising activity, controls for external company news and earnings announcement events, and the inclusion of firm, year-month, and day-of-the-week fixed effects, and suggest that one spillover effect of product market advertising is increased attention to financial information.

We also explore whose attention advertisements attract. In cross-sectional tests, ads by firms with both retail and institutional ownership attract financial attention, although the effect is marginally larger for firms with high retail ownership. This is consistent with evidence that Google searches capture the attention of retail/individual investors (Da, Engelberg, and Gao (2011)). We also examine whether the increased attention to ads varies by day of the week. Whereas Google searches for company tickers tend to be lower on weekends and holidays (Niessner (2014)), advertisements printed in weekend editions and on holidays tend to get more attention from investors. Google searches for company tickers increase by 5% for ads printed in weekend newspapers relative to the rest of the week, and by as much as 12% for ads printed in weekend business publications, which are more likely read by investors and include *The Wall Street Journal* and *Financial Times*.

[5] http://www.printpower.eu/userfiles/files/Attitudes_Consumers_Advertising_Media_Survey-VTT_Final_Version2.pdf

We next examine whether advertisements affect stock returns. Behavioral models suggest that increased attention can influence investors' purchase and sell decisions (Barber and Odean (2008)). Investors have thousands of stocks they can potentially buy, and past research suggests that investors are net buyers of stocks in the news, stocks with high trading volume or extreme one-day returns (Barber and Odean (2008)), and stocks with high brand recognition (Grullon, Kanatas, and Weston (2004)). Increased attention can thus attract *potential* investors and generate positive price pressure (Da, Engelberg, and Gao (2011)). Behavioral models have different predictions of the effects of increased attention on *current* investors. Prospect theory suggests that individuals are averse to realizing losses (Kahneman and Tversky (1979)). An implication of prospect theory is that investors are more likely to hold losing investments and sell winning investments, a tendency labeled the disposition effect (Odean (1998), Shefrin and Statman (1985)). Increased attention to the winning investments of current investors can thus generate negative returns as these investors sell their winners, but should have no effect on losing investments. We test these theories and examine how advertising-induced attention impacts financial markets.

Using panel regressions with an extensive fixed-effects structure, we find evidence that weekend advertisements put temporary downward pressure on prices when the market subsequently opens. We further find that this effect is concentrated in stocks with a positive prior week's return (winners). A weekend advertisement for a winning stock is associated with a 14 basis-point decrease over the following two trading days, whereas we find no return effect for stocks with a negative prior week's return. These results are consistent with investors' tendency to sell winners and hold losers (Odean (1998)) and suggest that a significant portion of the advertising-induced attention is attributable to current, rather than potential, investors.

We next examine whether managers strategically manipulate advertising activity in the weeks around quarterly earnings announcements to attract or minimize attention. Anecdotal evidence indicates that some titles allow for next day publishing or require little more than

one week notice, suggesting that managers can alter advertising activity with little advance notice.[6] Furthermore, prior research finds that managers alter advertising expenditures to meet earnings benchmarks, suggesting that managers have the discretion to change their current advertising activity (Cohen, Mashruwala, and Zach (2010)). If managers believe that advertisements have spillover effects on financial markets, they might chose to adjust their advertising activity around earnings announcement dates. A large literature on earnings management suggests that managers know whether their earnings will differ from analysts' consensus forecast.[7] Because managers typically know at the end of each quarter whether they are going to beat analysts' forecasts, they can strategically increase (decrease) advertising when they expect to beat (miss) analysts' forecasts. Furthermore, because we study changes in advertising outside the reporting period, any manipulation of advertising activity cannot affect the concurrently reported earnings.

We examine advertising activity in the weeks around earnings announcements for our full sample of firms and advertisements, and find a temporary 3% increase in weekly advertising activity around positive-news announcements and some evidence of a decrease around negative-news announcements. These results persist for approximately three weeks, after which advertising reverts to normal levels. The temporary nature of these changes in advertising frequency suggests that they are not a result of changes in advertising budgets due to corporate profits/losses. These findings suggest that managers try to affect attention around earnings announcements by altering their firm's advertising activity.

In our final analysis we examine whether increased attention due to advertising affects stock market reactions to earnings announcements. Prior research provides evidence that attention constraints can result in underreactions to earnings announcements (Hirshleifer, Lim, and Teoh (2009); DellaVigna and Pollet (2009)). We find that abnormal levels of advertising on earnings announcement dates generate a short-term overreaction to positive

[6] http://placeanad.chicagotribune.com/contact-us

[7] See Kothari (2001), Fields, Lys, and Vincent (2001), and Healy and Wahlen (1999) for surveys of the earnings management literature.

earnings surprises. This evidence complements prior research and suggests that increasing attention also affects market participants reaction to earnings announcements.

2 Related Literature

Our findings relate to a growing literature on the effects of advertising on firm value. Grullon, Kanatas, and Weston (2004) and Frieder and Subrahmanyam (2005) investigate the effect of firm/brand visibility on stock ownership, and find that increased visibility is associated with a more diverse ownership structure and stock market liquidity. Gurun and Butler (2012) find that advertising expenditures are associated with positive local media slant and impact equity values. Chemmanur and Yan (2009) provide a signaling theory and supporting empirical evidence that product market advertising can mitigate underpricing of new equity issues, and Gao and Ritter (2010) find that an investment bank's marketing efforts increases the elasticity of demand for seasoned equity offerings. Lou (2014) and Chemmanur and Yan (2010) present evidence that stock prices rise in years with high annual advertising expenditures, only to reverse over following years. These papers shed evidence that annual measures of advertising are associated with firm visibility and annual returns, but due to data constraints cannot identify the causal spillover effects of placing advertisements.[8]

We are among the first to provide empirical evidence of a causal link between product market advertising and immediate attention to financial information. We overcome data limitations of prior research with a novel data set of firm advertisements appearing across 419 weekly and 39 daily print publications. This micro data allow us to determine the causal effects of advertisements on investor attention and daily stock returns. We find that advertisements attract investors' attention, particularly on weekends, and that this

[8] A related area of research on mutual fund advertisements finds that these ads generate increase fund flows but do not predict future performance. See Jain and Wu (2000), Cronqvist (2006), Reuter and Zitzewitz (2006).

advertising-induced attention generates temporary downward price pressure as investors sell their winning stocks, consistent with the disposition effect documented by Odean (1998).

We also contribute to literature on communication between investors and managers. Prior research shows that firms often initiate an investor relations (IR) program to attract investors' attention and increase visibility (Bushee and Miller (2012)), and that firms strategically use press releases to influence media coverage and stock returns (Ahern and Sosyura (2014)). We provide evidence of an additional mechanism (advertisements) companies use to communicate with investors.

3 Data

We collect print advertising data from MediaRadar for the years 2007 to 2013. MediaRadar regularly scans over 4,000 daily, weekly, and monthly print publications and identifies key attributes of each advertisement, including brand name, ultimate parent company, ad size, location within the publication, and estimated cost (based on the publication's published rates). MediaRadar's target clients are print publications (e.g., *The New York Times, People*), for whom MediaRadar provides information about companies' advertising activities.

We start with the MediaRadar universe of over 3,340,330 daily and weekly print advertisements by 164,448 unique entities. We restrict our sample to entities that advertise at least 30 times in at least one year to exclude low-frequency advertisers. We drop all monthly publications due to imprecise publication dates, leaving us with 458 unique publications. We use the ultimate parent name for each advertisement to manually match this sample to a list of public and private entities from Capital IQ. We successfully match 4,357 entities, of which 27% are public firms, 68% are private firms, and 5% are governments/institutions/associations. Our analyses focus on the 971 public firms (89% of which are from the United States) for which we can identify a permno and merge with CRSP/Compustat.

Because this is the first use of MediaRadar data in an academic research setting, we provide a number of descriptive statistics on the characteristics of these print advertisers

and the nature of their advertising activity (Table 1 Panels A through I). Table 1 Panel A summarizes advertising activity for our sample of 569,957 ads by 971 public firms, costing an estimated $35,240 million based on the publications' posted rates. These firms advertised 12,166 distinct brands during our sample period, with Proctor & Gamble advertising the largest number of brands (175). MediaRadar added new titles throughout our sample period as they expanded their business, increasing from 43 daily/weekly titles in 2007 to 417 in 2013. In our empirical analysis we address this expanding coverage by including year-month fixed effects to allow for a non-linear time trend.

Table 1 Panel B presents firm characteristics for our sample of public firms. Firm size is heavily skewed towards larger firms (average market cap $19,553 million and median market cap $4,220 million). In 2007 our sample firms represent 49.8% of the Comp/CRSP total market capitalization, which increases to over 59% by 2012. The average firm in our sample has 66% institutional ownership, compared to the average institutional ownership for the Comp/CRSP universe of 46%. Our average firm has revenues of $16,896 million, spends $352 million on advertising, and generates net profits of $1,119 million. Our sample firms spend an estimated $7.3 million each year on 118 print advertisements for 31 distinct brands placed across 33 publications. Although this is a small proportion of their total advertising budget, we find that print advertising is representative of firm's more general advertising activity. We merge advertising data from MediaRadar with monthly advertising expenditures from Kantar Media's Ad$pender database, which monitors firms' total advertising activity across print, television, and radio, and find that print advertising and total advertising expenditures are positively and significantly correlated (correlations range from 0.45 to 0.60). We thus believe that the benefits of using print advertisements (e.g., exact measurement, data availability) outweigh the fact that a small proportion of firms' advertising budget is spent on print advertisements.

Table 1 Panel C tabulates the frequency of firm-specific advertising activity across months. Advertising is fairly evenly distributed across months, ranging from 15 to 17.8 ads per month,

with the most ads being placed in December. We also tabulate the estimated readership of the publications containing the advertisements, taken from the Media Intelligence Center at the Alliance for Audited Media. These estimates suggest that firms potentially reach 10 to 13 million readers each month with their advertisements. Table 1 Panel D tabulates average firm advertising activity by calendar year. As mentioned above, MediaRadar expanded its coverage during our sample so these numbers capture changes in both advertising activity and sample composition. Table 1 Panel E tabulates average firm advertising by day of the week. Print advertisements are most frequently published on Mondays, with companies on average spending $75,000 to reach 654,000 readers, whereas companies infrequently advertise on Tuesdays and Saturdays. To address this variation in advertising days, we include day-of-the-week fixed effects in all our analyses.

Table 1 Panels F and G tabulate our sample composition across the Fama-French 48 industries. Of particular note, only 9% of our firms belong to the retail industry, and they publish 15% of our ads. Thus although retail is well represented, industries such as Business Services, Pharmaceutical Products, and Banking are also well represented.[9] Forty-five industries are represented (omitted are 'Coal', 'Precious Metals', and 'Fabricated Products'), although some are sparsely populated (only 1 company each in the 'Non-Metallic and Industrial Metal Mining' and 'Shipping Containers' industries).

Table 1 Panel H tabulates total advertisements and the publication frequency for our sample of public firms by publication title for the 30 most commonly used titles. *The New York Times* contains over 50,000 advertisements in our sample, followed by *The Los Angeles Times* with 27,650 ads and *The Wall Street Journal* with 22,149 advertisements. These three daily national newspapers publish 17% of the total 569,957 advertisements in our sample, and thus a small number of publications carry the vast majority of ads. Our sample comprises publications distributed over various frequencies: daily (9%), weekly (55%), and bi-weekly(36%).

[9] Our main results are robust to dropping any one of these industries.

4 Advertising and Investor Attention

4.1 Attention to Financial Information

In this section we examine whether print advertisements attract investors' attention to financial information. Ads tend to highlight firms' products and services, and typically target current and potential customers. However, prior research shows that investors are more likely to invest in stocks they frequent as customers (Keloharju, Knüpfer, and Linnainmaa (2012)), suggesting that consumers and investors do not necessarily represent distinct groups. The public nature of advertising and the overlap between consumers and investors suggest potential spillover effects from advertisements to financial markets.

Prior research finds that external stimuli affect investors' choice set of stocks to buy (Odean (1999); Barber and Odean (2008)). Investors must choose between thousands of possible stocks to purchase, and potentially face attention constraints in actively monitoring their stock portfolios. Advertisements are designed to attract attention. If noticed by current or potential investors, ads might prompt these individuals to look up a firm's current stock price, financial performance, or even purchase/sell the firm's stock. Our first hypothesis is thus that advertisements attract investors' attention to the advertising firm's financial information. Whereas previous research finds evidence that advertising is correlated with proxies of investors' attention using coarse (e.g., annual) data, to our knowledge, our paper is the first to provide evidence of a causal link between product market advertising and investors' attention to financial information.

We use log daily Google search volume index (SVI) for company tickers as a measure of investor attention to the financial information of a company. Prior research (e.g. Da, Engelberg, and Gao (2011) and Drake, Roulstone, and Thornock (2012)) demonstrates that Google SVI is a reasonable, timely measure of investor attention which captures investors' demand for financial information. Following Da, Engelberg, and Gao (2011) and Drake, Roulstone, and Thornock (2012), we use the volume of Google searches for a company's ticker

on a given day as a measure of investors' attention to a company's financial information. We use searches for ticker symbols instead of firm names for two reasons. First, people use many different versions of a company's name. Second, when people search for "Walmart," they are generally not looking for financial information about the company. Using ticker symbols helps alleviate both of these concerns.

Google Trends, a service run by Google, provides a daily SVI for search volumes above a certain (unspecified) threshold going back to January 2004. The index is not the raw number of searches (i.e., absolute traffic), but the popularity of the term relative to other search terms during the same time period. This adjustment helps normalize the data for general internet usage on that day. Furthermore, Google scales the data by the highest search volume for the given search period. For example, if someone searches for "WMT" during February 2010, and the highest search volume for that period was on February 21, the search index that Google displays has SVI = 100 for February 21, and all other SVIs for that search period are relative to the SVI on February 21. Therefore, results across different search periods are not easily comparable. To get daily search results, we have to search one month at a time. To make daily SVI for a given company comparable across months, we also perform a search over the entire time period (January 2004 - December 2013) at the weekly level for each company. We then scale the daily SVI_d by the weekly SVI_w, using the following formula:

$$SVI = SVI_d * SVI_w/100 \ .$$

We use the natural logarithm of $SVI+1$ to normalize the distribution. Although SVI cannot be converted into the actual number of Google searches, larger SVI's are indicative of greater search for financial information.

Our advertising data include daily and weekly publications. For daily publications, we know the exact date the paper was sold (and mostly likely read). The dates of some weekly

publications are off by a day or two.[10] In this section we perform analysis at the daily level, so knowing the exact publication date is crucial. We therefore restrict our analysis to 489 firms with Google and advertising data placing 239,196 ads (41% of our sample) appearing in 39 daily publications for which we are confident in the publication date in order to reduce noise.

Because we know the exact date advertisements are printed, we use panel regressions of daily investor attention measures on levels of advertising activity. We also use an extensive fixed effects structure. Specifically, we include firm fixed effects to control for time-invariant attributes of firm advertising activity and our investor attention measures. Due to the expanding nature of our advertising sample, we also include year-month fixed effects to allow for a nonlinear time trend and control for seasonal patterns in advertising activity, and day-of-the-week fixed effects to control for differences in advertising activity and investor attention across days of the week. As a result of these fixed effects, our analysis exploits within-firm variation in advertising activity and investor attention on the same day of the week (e.g., Friday) within the same year-month. To account for time-series correlation in the residuals, standard errors are clustered at the firm level.

We run the following regression:

$$\begin{aligned} Google\,SVI_{i,t} &= \alpha + \beta Ad\,Day_{i,t} \\ &+ \gamma_1 News\,Dummy_{i,t} + \gamma_2 EA\,Day_{i,t} + \gamma_3 EA\,Window_{i,t} + \gamma_4 Holiday_t \\ &+ \delta\text{Firm FE} + \eta\text{Day-of-the-week FE} + \theta\text{Year-Month FE} + \epsilon_{i,t} \end{aligned} \tag{1}$$

where the dependent variable $Google\,SVI_{i,t}$ is the Google search measure for company i on date t. $AdDay_{i,t}$ is a firm's advertising activity on day t, and is zero if the firm did not advertise. $News\,Dummy_{i,t}$ is an indicator variable equal to one if firm i is mentioned in at

[10] For example the advertising date for *The Economist* is marked on Saturdays, even though *The Economist* goes on sale on Fridays.

least one news article on day t from any news source (taken from Ravenpack), $Holiday_t$ is an indicator for national US Holidays, $EA\,Day_{i,t}$ is an indicator variable equal to one if the firm announced earnings on day t and zero otherwise, and $EA\,Window_{i,t}$ is an indicator variable equal to one if the firm will announce earnings in one to five days or announced earnings 1 to 5 days previously, and zero otherwise.[11] We control for days with earnings announcements and the 10 days around earnings announcements since Google searches tend to be higher during those time periods (Drake, Roulstone, and Thornock (2012)), and as we show in section 6, managers also tend to manipulate advertising around earnings announcements.

Table 1 Panel I tabulates firms' daily advertising activity. We have daily advertising data for 713 firms, for which we form an unbalanced panel beginning with each firm's first recorded advertisement in MediaRadar. Our firms have an average time series of 1,246 days (3.4 years), which allows us to exploit within firm variation. We have Google search data for 535,392 firm-day observations for 489 firms. $Ad\,Dummy$ is an indicator variable if the firm placed at least one print ad on a given day. The time-series average of $Ad\,Dummy$ thus captures how frequently firms advertise, which in our sample is 8%, suggesting that the average firm advertises every twelve days. We also exploit variation in the number of advertisements placed (Ads), their approximate cost ($Spend$), estimated readership ($Readership$), and the type of publication in which the firm advertises. The average firm places 0.2 ads each day, spending \$11,000 to reach 190,000 individuals. $Business\,Dummy$ indicates whether a firm placed at least one advertisement in one of the five daily publications classified as "business" by MediaRadar (2.3% of firm observations).[12]

Table 2 Panel A presents the results of estimating model (1) for all companies, as well as cross-sectional analyses by institutional ownership (above/below median).[13] The results are consistent with our hypothesis that advertisements attract investors' attention to the

[11] Holidays include New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, and Christmas Day

[12] *The Wall Street Journal, Investor's Business Daily, Financial Times, Daily Journal of Commerce,* and *Daily Business Review.*

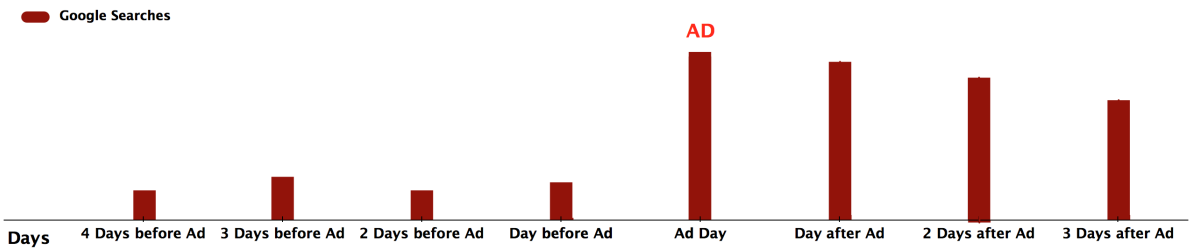
[13] We obtain institutional ownership data from the CDA/Spectrum Institutional (13f) Holdings database.

advertising firm's financial information. The first three columns use *Ad Dummy* and the last three columns use *BusinessDummy* as our measure of advertising activity. Because the dependent variables are measured in logs, we can interpret the coefficients on *Ad Dummy* and *Business Dummy* as the percent change in Google searches on an advertising day, relative to a day with no ads for the given company. Advertisements are associated with a 2.8% increase in Google searches on the day the advertisement is printed. For business ads the effect is larger than for *Ad Dummy* (3.7%), suggesting that investors are more likely to see and respond to advertisements in these titles.

Not only are the coefficients on advertisements statistically significant, the magnitudes are also large. Our control variables for news coverage and earnings announcement dates provide natural benchmarks to evaluate the effect of advertising on investor attention. Our analysis suggests that Google searches for company tickers increase by 3% on days with media coverage (*News Dummy*) and 15% on earnings announcement dates (*EA Day*). Advertisements thus trigger approximately the same increase in attention to financial information as a news story about the company, and about $\frac{1}{5}^{th}$ of the increase in attention as an earnings announcement. Results in columns (2), (3), (5), and (6) show that advertisements attract attention of both retail and institutional investors.

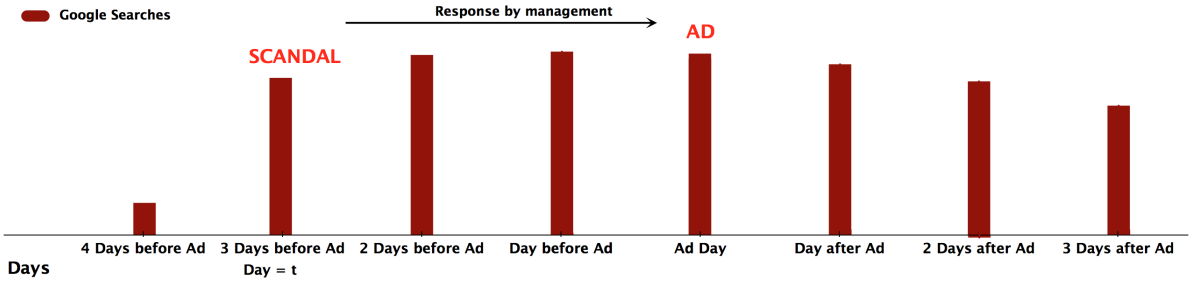
The results in Table 2 Panel A suggest that advertisement days are associated with higher levels of Google searches for company tickers, suggesting that investors pay more attention to the financial information of the firm. To determine whether ads directly *cause* greater search for financial information, we take advantage of the granularity of our data and look at SVI before and after the advertisement. For advertisements to cause the increase in Google SVI, we would want to see the following pattern in Google searches around the advertisement:

Figure 1



In figure 1, investors' attention is flat until the ad appears in the paper. Attention then spikes on the day of the ad and decreases over several days following the ad. Our results in table 2 are consistent with this image. However, an alternative explanation also consistent with our results is depicted in figure 2.

Figure 2



In figure 2, a scandal (for example a corporate data hack) occurs on a day t (3 Days before Ad). This scandal causes investors to Google the company's ticker, searching for financial information. The management of the company responds to the scandal by placing an ad in the paper three days later. In three days, as the ad appears in the paper, Google searches are still high following the scandal, yet the cause for the increased SVI is the scandal, and clearly not the advertisement.

We exploit the daily frequency of our advertising data to separate these competing explanations. We estimate the following model:

$$\begin{aligned} Google\,SVI_{i,t} &= \alpha + \beta_1 2DaysBeforeAd_{i,t} + \beta_2 DayBeforeAd_{i,t} \\ &+ \beta_3 AdDay_{i,t} \\ &+ \beta_4 DayAfterAd_{i,t} + \beta_5 2DaysAfterAd_{i,t} + \beta_6 3to5DaysAfterAd_{i,t} \\ &+ \gamma_1 News\,Dummy_{i,t} + \gamma_2 EA\,Day_{i,t} + \gamma_3 EA\,Window_{i,t} + \gamma_4 Holiday_t \\ &+ \delta\text{Firm FE} + \eta\text{Day-of-the-week FE} + \theta\text{Year-Month FE} + \epsilon_{i,t} \end{aligned} \tag{2}$$

where the dependent variable $Google\,SVI_{i,t}$ is the Google search measure for company i on date t. $AdDay_{i,t}$ is a firm's advertising activity on day t, and is zero if the firm did not advertise. $DayBeforeAd_{i,t}$ and $2DaysBeforeAd_{i,t}$ are set equal to whatever the firm's ad measure will be in one or two calendar days, respectively, and capture any changes in investor attention prior to an ad's publication. $DayAfterAd_{i,t}$, $2DaysAfterAd_{i,t}$, and $3to5DaysAfterAd_{i,t}$ equal the firm's ad measure from one, two, or three to five days earlier and capture the duration of any attention affect. Our primary specification uses indicator variables for whether or not a company advertised. Thus when $AdMeasure$ is an advertising indicator, $DayBeforeAd_{i,t}$ is set to one if the firm will advertise on the next day and $DayAfterAd_{i,t}$ is set to one if the firm advertised on the previous day.

Table 2 Panel B presents the results of estimating model (2) for all companies, as well as cross-sectional analyses by institutional ownership (above/below median). The first three columns use $Ad\,Dummy$ and the last three columns use $Business\,Dummy$ as a measure of advertising activity. The results are consistent with our hypothesis that advertisements cause an increase in investors' attention to financial information. The coefficients on $2DaysBeforeAd$ and $DayBeforeAd$ are statistically insignificant and close to zero, suggesting that Google searches for company tickers are flat in the days prior to the advertisement. On the day the advertisement is printed (Ad Day), Google searches for company tickers

increase by 2.3%. The increased attention persists for two days (positive and significant coefficients on $DayAfterAd$ and $2DaysAfterAd$) and then subsides (insignificant coefficient on $3to5DaysAfterAd$). The pattern for business ads is similar to the pattern for $Ad\,Dummy$, but the effects are larger (3.6%), consistent with the results in Panel A.

In Table 2 Panels A and B we use two advertising measures—whether there was at least one ad for company i on day t and whether there was at least one ad in a business publication for company i on day t. We also use three alternative, continuous, measures of advertising activity—$Log(Ads+1)$, $log(Spend+1)$ and $log(Readership+1)$. Publications vary in the size and nature of their audiences (e.g., national vs. regional newspaper). Companies can place larger, more expensive advertisements and/or advertise in publications with greater readership to reach more individuals, and consequently be more likely to also attract investors' attention. The results in the Appendix Table A1 indicate that investor attention is increasing in these three attributes of advertising.

Next we examine whether using Google searches for company *tickers* captures attention to firms' financial information. Alternative attention measures include Google searches for company names or daily views of companies' Wikipedia pages. The nature of the research question should determine which measure is most appropriate. For instance, a finding that advertising increases attention to the company itself would be unsurprising, as this is the intent of advertising. In this paper, we examine whether advertising increases attention to the firm's *financial information*. Searches for company tickers allows us to separate attention to the firm itself from attention to the firm's financial information.

To examine whether Google searches for company tickers captures attention to financial information, we re-run our analysis in Eq. (1), except we use Google searches for the company name instead of the company ticker as the dependent variable.[14] The results are

[14] We are very grateful to Zhi Da, Joseph Engelberg, and Pengjie Gao for providing cleaned up company names. They asked two research assistants to record how they would search for each company based on the company name in CRSP. If there were differences between the reports, they used Google Insights "related search" feature to determine which query is most common.

presented in Table 2 Panel C. Columns (1) and (2) use *Ad Dummy* and columns (3) and (4) use *Business Dummy* as a measure of advertising activity. For both types of advertising, searches for company tickers and for company names increase on advertising days. However, the effect of an ad on search for company names is twice as large as the effect on search for company tickers (6% vs. 3%). This result is unsurprising, as the primary goal of advertising is to attract attention to the company itself and/or its products. We view the larger impact of ads on name searches as indicative that Google searches for company names capture attention to the company, and is different than attention to the firm's financial information.

The effect of earnings announcements on Google searches provides additional evidence that ticker SVI captures attention to financial information whereas name SVI captures more general attention. Looking at the coefficients on *EA Dummy*, ads and news stories about the company trigger a larger increase in searches for the company's name than searches for the company's ticker. However, when the news is financial in nature, the pattern reverses. Earnings announcements trigger a larger increase in searches for the company's ticker than searches for the company's name. Around earnings announcements, the increase in searches for tickers is twice as large as the increase in searches for the company names (14.2% vs. 7.7%). This provides corroborative evidence that searches for company tickers are a preferred proxy for investors' attention to financial information.

4.2 Investor Attention throughout the Week

Next we examine whether the effect of advertising on investors' attention varies by the day of the week. Prior research suggests that investors' attention to financial information is lower on Fridays (e.g., DellaVigna and Pollet (2009)), and over the weekend (e.g., Niessner (2014)). However, investors might have more time to read newspapers and magazines on weekends and holidays, and therefore more likely to notice a weekend ad. To examine whether investors

react more to advertisements on certain days of the week, we estimate the following model:

$$\begin{aligned} Google\,SVI_{i,t} &= \alpha + \beta Ad_{i,t} + \gamma DOW_t + \theta Ad_{i,t} \times DOW_t \\ &+ \delta Holiday_t + \zeta Ad_{i,t} \times Holiday_t \\ &+ \psi \text{Firm FE} + \eta \text{Year-Month FE} + \epsilon_{i,t} \end{aligned} \tag{3}$$

where DOW_t are dummy variables for each day of the week (e.g., Monday, Tuesday) and other variables are as previously defined. In our model, γ captures differences in Google search across days of the week, θ captures the incremental difference if at least one advertisement appears on a particular day of the week, δ captures differences between holidays and non-holidays, and ζ captures the incremental difference if at least one ad appears on a holiday.

Results for model (3) are presented in Table 3 Panel A. In the first three columns we use *Ad Dummy* as our measure of advertising, and in the last three columns we use *Business Dummy*. The omitted day variable is Tuesday. When we use *Business Dummy* we exclude Sundays, as there are no business publications on Sundays in our data. Columns 1 and 4 estimate the effect of ad days for our entire sample of daily advertisements. Consistent with prior evidence, investors are less likely to Google a company's ticker over the weekend and on holidays (large negative coefficients on Sat, Sun, and $Holiday$). Coefficients on the interaction terms with an advertising dummy show that advertisements published Monday through Friday do not significantly increase investors' attention. However, if an ad is published on a weekend, Google searches for that company's ticker are 4% higher than on weekends with no advertising by that company (e.g., $Ad\,Measure \times Sat$). The effect is even stronger for advertisements appearing in a weekend business publication (11.7%) or in a business publication on a holiday (6.3%).

We also run our analysis separately for companies with high retail-investor ownership and for companies with high institutional-investor ownership. In columns 2 and 5 (*Ad Dummy*

and *Business Dummy*, respectively) we find evidence that retail investors respond to ads published on Mondays and weekends (3-13%), and on holidays for ads published in business titles (10%). Institutional investors do not seem to react to general ads differently throughout the workweek, yet they are 11% more likely to search for the company's ticker if an ad is published in a business publication on the weekend.

Results in Table 3 Panel A suggest that advertisements have a bigger impact on investors' attention to financial information over the weekend. If Google searches for company tickers indeed capture investors' attention, we might expect that ads in business publications cause a bigger increase in searches for company tickers than ads in general publications, as investors are more likely to read business papers. Thus we next examine whether advertising in business publications has a bigger impact on attention to firm's financial information than advertising in general-audience publications. We first separate ads by whether they were printed during the week or on the weekend, and then estimate the incremental impact of having an ad in a business publication relative to a general publication. We estimate the following model:

$$\begin{aligned} Google\,SVI_{i,t} &= \alpha + \beta_1 Weekday\,Ad_{i,t} + \beta_2 Weekend\,Ad_{i,t} \\ &+ \delta_1 Weekday\,Business\,Ad_{i,t} + \delta_2 Weekend\,Business\,Ad_{i,t} \\ &+ \gamma_1 Holiday_t + \gamma_2 News\,Dummy_{i,t} + \gamma_3 EA\,Day_{i,t} + \gamma_4 EA\,Window_{i,t} \\ &+ \mu\text{Day-of-the-week FE} + \psi\text{Firm FE} + \eta\text{Year-Month FE} + \epsilon_{i,t}, \end{aligned} \tag{4}$$

where β_1 and β_2 capture the differences in Google search for having an ad in any publication (business or general) during the week or on a weekend, respectively, and δ_1 and δ_2 capture the incremental difference of an advertisement in a business publication during the week or on a weekend, respectively.

Results for model (4) are presented in Table 3 Panel B. Similar to the results in Panel A, ads printed during the week do not differentially increase attention to the firm's financial

information ($Weekday\ Ad$), and ads that are printed in the weekend editions increase Google searches for company tickers by 5% ($Weekend\ Ad$). However, if the ad comes out in a business weekend publication, the total increase in attention is more than twice as large (5.2% vs 5.2 + 6.9%) relative to a general weekend publication and the difference is statistically significant. This test provides additional evidence that advertisements not only attract attention from customers, but also from investors.

Results in Tables 2 and 3 are consistent with the hypothesis that advertisements generate increased interest in firms' financial information. Search for tickers is insignificant prior to an ads publication and immediately spikes by 3% when an ad is printed. The results are consistent across multiple measures of advertising activity, the effects are greater for ads printed on weekends or business publications, and the effect of ads on search for financial information is smaller than the effect on search for general corporate information. Collectively, the evidence supports a temporary causal effect of print advertisements on attention to the advertising firm's financial information. In the next section we explore whether the temporary increase in investor activity caused by advertisements affects financial markets.

5 Financial Markets

The previous section provides evidence that advertisements attract investors' attention to financial information. In this section, we examine whether this increased attention has an effect on daily stock prices. Investors face a formidable task in selecting which stocks to buy, and prior research suggests that investors' purchase decisions are influenced by attention-grabbing events such as media coverage and extreme one-day returns (Barber and Odean (2008)). The buying activity of these attention-influenced investors should generate short-term positive returns, followed by reversals in the long run as prices converge to their fundamental value. Da, Engelberg, and Gao (2011) provide empirical evidence in support of this hypothesis, and find that abnormal weekly Google SVI predicts higher stock prices in the short term, which reverses over the following weeks. Thus if advertising attracts primarily

potential investors who subsequently buy the firm's stocks, then advertising should generate short-term positive returns.

Advertising can also generate negative returns if ads primarily reach current investors. Prospect theory suggests that individuals are averse to realizing losses (Kahneman and Tversky (1979)). When applied to investments, this behavioral theory implies that investors will hold their losing investments (postponing a loss realization), and sell their winning investments to recognize a gain. This tendency to sell winners and hold losers is labeled the disposition effect (Shefrin and Statman (1985), Odean (1998)). Thus increased attention to investors' winning investments generates negative returns if investors sell these investments, whereas increased attention to losing investments should have little or no effect on prices. If advertisements are primarily seen by current investors, then ads which occur when the stock's price is temporarily high should trigger sells and generate temporary downward price pressure. Thus, whether advertisements generate positive returns (due to purchases by potential investors) or negative returns (due to sells by current investors) is an empirical question.

We test whether the increased attention due to advertisements generates predictable stock returns, and whether these returns are consistent with a disposition effect. Using daily and cumulative short-window returns, we run the following regression:

$$\begin{aligned} Ret_{i,[t,t+k]} &= \alpha + \beta_1 Weekend\,Ad_{i,t} + \beta_2 Weekday\,Ad_{i,t} + \beta_3 WeekRet_{i,t} + \beta_4 News\,Dummy_{i,t} \\ &+ \lambda \text{Year FE} + \mu \text{Month FE} + \eta \text{Day-of-the-week FE} + \zeta \text{Firm FE} + \epsilon_{i,t}\ , \end{aligned} \tag{5}$$

where our dependent variable $Ret_{i,[t,t+k]}$ is the raw cumulative return of company i from day t to day $t+k$. We use four return windows as separate dependent variables (Day[-1,-1], Day [0,0], Day [0,1], Day [0,2]) to examine changes in stock price before ad days, the market response on ad days, and the duration of any advertising effect. $Weekend\,Ad$ is an indicator variable set to one on the first trading day of each week (typically Mondays) if the firm

placed an ad over the previous weekend. The previous section (Table 3 Panel C) provides evidence that investor attention to advertising is concentrated on weekends. Because stock markets are closed over weekends, we posit that any effect of increased attention to weekend advertisements will occur when the market opens. $Weekday\,Ad_{i,t}$ is an indicator variable equal to one if the firm placed at least one print ad on a given trading day and zero otherwise, and $WeekRet_{i,t}$ is the cumulative raw return for company i for days $t-5$ to $t-1$ to control for short-horizon reversals. We also include year, month, day-of-the-week, and firm fixed effects. The time fixed effects help control for differences in the number of advertisements across years, calendar months, and days of the week that could also be correlated with differences in returns. Because of the day-of-the-week fixed effects, $Weekend\,Ad$ captures the incremental effect of a weekend advertisement relative to a Monday effect. Firm fixed effects help control for average differences in returns and advertisement levels across companies. Standard errors are clustered by date to help control for cross-sectional correlation in the residuals.

Table 4 Panel A presents coefficient estimates from model (5). In column 2, $Weekend\,Ad$ is associated with a reduction in price of 10 basis points (significant at the 5% level), suggesting that trading days which follow weekends with advertisements have lower returns relative to trading days which follow weekends without advertisements. We see in column 1 that there is no change in returns prior to the weekend advertisement, suggesting that either weekend advertisements or something correlated with weekend advertisements is responsible for the negative returns. In untabulated analysis we find that news is infrequently released by our firms over weekends, suggesting that a correlated omitted variable is unlikely to explain our results. In columns 3 and 4 we find that weekend ads affect returns for two days, but have no effect over longer windows (insignificant coefficient over days [0,2]), and that ads placed during the week also have no discernible effect ($Weekday\,Ad$). $WeekRet$ is significantly negative in all columns, consistent with prior evidence of short-term return

reversals, and $News\,Dummy$ is significantly positive, suggesting that, on average, news is associated with positive returns.

The negative effect of weekend ads is consistent with a disposition effect of selling winners. To test this hypothesis, we split our sample into a positive- and negative-news sample using each firm's return over the previous five trading days, our $WeekRet$ variable. We believe that five trading days is long enough for investors to react to a price change, but short enough that companies likely do not adjust their advertising strategy in response to a rising or falling stock price.[15] Ads draw attention to stocks, and if that stock return is trending up ($WeekRet > 0$), then the disposition effect suggests that investors will be more likely to sell these winners, generating downward pressure on returns. Conversely, if the stock is trending down ($WeekRet < 0$), then the disposition effect suggests that investors will hold these stocks, with no resulting effect on market prices.

In Table 4 Panel B, columns one through four, we find that weekend ads have no effect on returns for losing stocks ($WeekRet < 0$). Conversely, for winning stocks, we find evidence of a significant drop in price following a weekend advertisement of 12 basis points (significant at the 1% level). There is no change in price prior to the advertising weekend (Ret [-1,-1]), and the return effect persists for just two days (Ret [0,1]). By the third day price has recovered, as the coefficient on Weekend Ad is now insignificant (Ret [0,2]), consistent with the generally temporary nature of disposition effects (Frazzini (2006)). Evidence that advertisements increase attention to financial markets, coupled with negative returns for advertising stocks with positive past returns, suggests that advertisements alert investors to certain winners in their own portfolios, and that consistent with the disposition effect these investors then sell these stocks.

Next, we examine whether the reaction of stock prices to advertising varies across different types of companies. We split our sample by median institutional ownership and focus on

[15] To make sure that advertising levels are not affected by the prior week's stock performance, we regress daily advertising activity on the prior week's stock return and find insignificant results.

observations with $WeekRet > 0$. Table 4 Panel C tabulates these results. For firms with both high institutional and high retail ownership, we find a similar 2-day negative return following weekend advertisements (15 and 14 basis points, respectively). Somewhat surprising, the one day returns are actually larger for firms with institutional ownership, suggesting a faster response by these investors, whereas for retail investors the price adjusts less quickly. The evidence suggests that return reversals following weekend advertisements is not specific to institutional or retail firms.

The results in Table 4 are consistent with the results on investor attention presented in Tables 2 and 3. When companies advertise, investors are more likely to attend to companies' financial information (as measured by Google searches for company tickers). This increase in attention is most pronounced over the weekends, and puts downward pressure on prices when the market opens on Mondays. We find this effect is driven by stocks with positive returns over the previous week, consistent with investors selling off their winners once they become aware of the appreciated stock price.

6 Earnings Announcements

6.1 Strategic Advertising

Our evidence suggests that print advertisements attract investors' attention. Because advertising is a firm-controlled activity, we next analyze whether managers adjust advertising around earnings announcements, and whether strategic use of advertising varies with characteristics of the earnings announcement. Prior research indicates that investor attention is heightened around earnings announcement dates (Drake, Roulstone, and Thornock (2012); Madsen (2014)), which might increase the benefits of attracting or minimizing attention through advertisements. A large literature on earnings management suggests that managers also likely know at the end of each quarter whether they are going to beat analysts' forecasts (see Kothari (2001), Fields, Lys, and Vincent (2001), and Healy and Wahlen (1999)). If

managers are aware that advertising can influence investor attention, they might choose to adjust advertising accordingly.

Our analysis assumes that managers have discretion to change at least a portion of their advertising on short notice. Publications vary in the amount of time required to publish an advertisement. Whereas prominent locations within a publication can be sold months in advance, many ads can be published within a week, and some even within a day.[16] Furthermore, prior research suggests that managers change advertising to meet earnings benchmarks, suggesting that at least a portion of the advertising budget is discretionary (Cohen, Mashruwala, and Zach (2010)).[17]

To test for variation in advertising around earnings announcement dates, we use fixed-effects panel regressions of weekly advertising activity on earnings announcement date indicators. Each week we determine whether a firm placed an advertisement ($Ad\,Dummy$), as well as the total number of ads placed, total readership of ads placed, and total dollars spent advertising (each in logs). To examine the change in weekly advertising around earnings announcements, we create indicator variables for each week relative to an earnings announcement week, where t=0 is defined as the week in which a firm announces earnings.

[16] Per conversations with *The Wall Street Journal*. See also http://placeanad.chicagotribune.com/contact-us.

[17] Because the time period we examine is outside the fiscal reporting period, advertising activity directly around an earnings announcement date has no bearing on the reported earnings number.

We run the following regression:

$$\begin{aligned} Ad_{i,t} &= \alpha + \beta_1 Pos\,Earnings_{i,t+2} + \beta_2 Pos\,Earnings_{i,t+1} + \beta_3 Pos\,Earnings_{i,t} \\ &+ \beta_4 Pos\,Earnings_{i,t-1} + \beta_5 Pos\,Earnings_{i,t-2} + \beta_6 Pos\,Earnings_{i,t-3} \\ &+ \beta_7 Pos\,Earnings_{i,t-4} + \beta_8 Pos\,Earnings_{i,t-5} + \beta_9 Pos\,Earnings_{i,t-6} \\ &+ \gamma_1 Neg\,Earnings_{i,t+2} + \gamma_2 Neg\,Earnings_{i,t+1} + \gamma_3 Neg\,Earnings_{i,t} \\ &+ \gamma_4 Neg\,Earnings_{i,t-1} + \gamma_5 Neg\,Earnings_{i,t-2} + \gamma_6 Neg\,Earnings_{i,t-3} \\ &+ \gamma_7 Neg\,Earnings_{i,t-4} + \gamma_8 Neg\,Earnings_{i,t-5} + \gamma_9 Neg\,Earnings_{i,t-6} \\ &+ +\lambda \text{FEs} + \epsilon_{i,t}\ , \end{aligned} \tag{6}$$

where $Pos\,Earnings_{i,t}$ is an indicator variable equal to one for week t around an earnings announcement date if the announced earnings were above or equal to the median analyst forecast, and $Neg\,Earnings_{i,t}$ is an indicator variable set to one for week t if the announced earnings were below the median analyst forecast. We evaluate changes in advertising in the weeks prior to an earnings announcement (e.g., $Pos\,Earnings_{t+2}$ indicates the firm will announce positive earnings in two weeks) and the weeks following an earnings announcement (e.g., $Pos\,Earnings_{t-2}$ indicates the firm announced earnings above the median forecast two weeks earlier). The coefficients on these week indicators thus capture the estimated change in weekly advertising activity around earnings announcement dates with positive or negative surprises, respectively. Because we are interested in changes in advertising around earnings announcements and less focused on specific dates, we include our entire sample of advertisements from daily, weekly, and bi-weekly publications. To control for variation in advertising across firms and time periods, we include firm and year-month fixed effects. Standard errors are clustered by firm to address time-series correlation in the error term.

We analyze over 200,000 firm-week observations for 912 firms for which we have advertising and earnings announcement data. Table 5 tabulates results from model (6). In Panel A we use a linear probability model with *Ad Dummy* as our dependent variable, an indicator

variable equal to one if the firm placed at least one print ad during a given week and zero otherwise. When earnings are positive, there is no significant difference in advertising two weeks prior to the earnings announcement ($Pos\,Earnings(t+2)$), followed by a significant increase in advertising from week $t+1$ through week $t-2$, and no significant difference in advertising during weeks $t-3$ through $t-4$. The time-series average of our dependent variable is 0.37, suggesting that our firms place an advertisement every 2.7 weeks. The coefficients indicate that these positive earnings announcement dates are associated with a 3% increase in weekly advertising activity.[18] This pattern suggests that managers temporarily increase advertising around positive news earnings announcements, and is inconsistent with an alternative view that the increased advertising is driven by revised budgets due to corporate profits/losses.

When earnings are below analysts' forecasts, we observe no significant reduction in the likelihood of advertising. In columns (2) and (3), we separate companies by institutional ownership (above/below median). Whereas both types of companies increase advertising around positive earnings announcements, only companies with high retail ownership appear to decease advertising after negative earnings surprises. Furthermore, coefficient estimates are generally larger for firms with retail ownership, consistent with more extensive use of strategic advertising by managers with retail investors.

In Panel B we examine three alternative measures of daily advertising as our dependent variables: *Ads* (the natural log + 1 of the number of print ads placed), *Readership* (the natural log + 1 of the estimated readership for all ads placed), and *Spend* (the natural log + 1 of the estimated dollars spent on advertising). Consistent with panel A we find evidence that managers increase advertising when earnings are positive, and some evidence that they decrease advertising when earnings are negative.

The results in this section suggest that firms temporarily change their advertising activity around earnings announcement dates. The direction of manipulation is consistent with managers attempting to minimize investor attention when earnings are poor, and in-

[18] $0.011/0.37 = 3\%$.

crease attention when earnings are good. There are many benefits of advertising, including long-term brand building, more dispersed stock ownership, increased liquidity, and positive media slant (e.g., Grullon, Kanatas, and Weston (2004), Gurun and Butler (2012)). Managers trade-off these benefits to influence investor attention when they strategically manage advertising activity.

6.2 Earnings Announcement Returns

We next explore whether advertising-induced attention affects stock return reactions to earnings announcements. These tests build on previous research that distractions, such as announcing earnings on Fridays or busy-announcement days, generate significant market underreactions to the announced earnings (Hirshleifer, Lim, and Teoh (2009), DellaVigna and Pollet (2009)). Our evidence suggests that advertising attracts investors' attention and managers tendency to alter advertising activity based on the earnings surprise. We therefore test whether increased attention generates overreactions to announced earnings.

Following prior research, we first determine each earnings announcement date for our sample of firms as the earlier of the Compustat and I/B/E/S dates. For each of these events we calculate the firm's cumulative abnormal return over event days 0 and 1 (compounded raw return less compounded market return), as well as an estimate of the associated earnings surprise (announced EPS less analysts' consensus forecast divided by end of period stock price). Our goal is to test whether, conditional on a level of earnings, firms with greater advertising activity realize larger abnormal returns. Given the low frequency of observed advertising over these short windows and minimal number of firm-specific event days, for these tests we estimate a measure of abnormal advertising. We calculate the dollars spent on advertising for these same two event days, and subtract the firm's average advertising expenditures over the last 12 weeks for the same days of the week. Thus if a firm announces earnings on a Wednesday, we calculate total dollars spent on Wednesday and Thursday of the announcement week, and subtract average dollars spent on Wednesdays and Thursdays

over the past 12 weeks. Because we look at advertising over multiple days we include advertisements in both daily and weekly publications.

We thus run the following regression:

$$\begin{aligned} CAR[0,t] &= \alpha + \beta_1 Earnings\,Quintile + \beta_2 High\,Spend + \beta_3 Earnings \times High\,Spend \\ &+ \gamma \text{Controls} + \lambda \text{FEs} + \epsilon_{i,t} \ , \end{aligned} \tag{7}$$

where $Earnings\,Quintile$ is the scaled quintile-ranked earnings surprise and $High\,Spend$ is an indicator variable set to one if the firm's estimate of abnormal advertising is above the median (both based on independent quarterly sorts). We follow previous literature and include as controls quintile ranks of size, book-to-market, earnings surprise volatility (standard deviation of a firm's earnings surprise over the past 4 years, with a minimum of 4 observations), institutional ownership, log(1+ # of analysts), reporting lag, and reporting lag squared. We also include year, month, day-of-the-week, and Fama French 48 industry fixed effects. Standard errors are clustered by date to address cross-sectional correlation in the error term.

The results of model (7) are tabulated in Table 6. In column 1, the main effect of $Earnings\,Quintile$ is a significantly positive 0.032, suggesting that an increase in earnings from the bottom to top earnings surprise quintile is associated with a 3.2% increase in abnormal returns. The interaction term $Earnings \times High\,Spend$ is a positive and significant 0.009, suggesting that announcement returns are 90 basis points larger (a 28% increase) for firms with positive abnormal advertising over the announcement period, relative to firms with the same level of earnings. In columns 2 and 3 we separately analyze companies in the bottom and top earnings quintile, and find the effect of advertising is specific to firms with large positive earnings surprises. Announcement returns are 110 basis points larger for firms with similar positive earnings surprises but high abnormal advertising. We next split these high and low samples by median institutional ownership (columns 4-7),

and find that the effect of advertising is most pronounced for firms with high institutional ownership. Further, we find evidence in the sample of firms with negative earnings surprises and high institutional ownership that high advertisers realize significantly lower returns than low abnormal advertisers. This provides evidence that high levels of abnormal advertising generate temporary overreactions to announced earnings.

7 Conclusion

Although advertising traditionally targets consumers, investors can also take notice. According to a May 2013 Forbes article, when J.C. Penny released an ad in 2013 "begging" shoppers to return, one person commented, "As an active investor in this company, I found hope in this simple video."[19] Although there is some anecdotal evidence that advertising can also attract the attention of investors, testing whether advertising affects investors' attention over relatively long time horizons (e.g., annually) can be tricky due to concerns about reverse causality or omitted variables.

We use detailed data on firms' daily print advertising activity to show that print advertisements draw investors' attention to firms' financial information. Consistent with a disposition effect, we find that investors appear to sell firms that advertise if the firm's stock price is trending up over the previous 5 days. Furthermore, we find that managers take advantage of the fact that advertising can attract investors' attention around earnings announcement dates by temporarily increasing advertising when earnings are positive, and temporarily decreasing advertising when earnings are negative. Finally, we find that this increased advertising on earnings announcement dates is associated with larger announcement returns relative to firms with similar earnings.

[19] http://www.forbes.com/sites/clareoconnor/2013/05/01/j-c-penney-releases-apology-ad-begging-shoppers-to-come-back/

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Table 1
Summary Statistics

This table shows summary statistics for the sample of public firms with advertising data from MediaRadar.

Panel A: Total Print Advertising by Year

	Firms	Brands	Titles	Ads	Spend (Mil.)
2007	413	1,975	43	17,291	2,416
2008	472	2,410	79	24,613	3,920
2009	576	3,115	152	48,464	4,061
2010	734	4,527	264	90,341	4,434
2011	864	5,923	396	137,335	5,696
2012	901	6,696	418	143,730	8,023
2013	869	6,265	417	108,183	6,691
All Years	971	12,166	458	569,957	35,240

Panel B: Annual Sample Public Firm Characteristics (2007-2013)

	Mean	Median	SD	P1	P99
Market Cap (millions)	19,601	4,233	41,988	16	201,590
Total Assets (millions)	58,697	5,522	254,336	37	1,546,441
Revenues (millions)	16,827	4,079	39,270	25	169,719
Net Income (millions)	1,130	173	4,197	-3,719	17,146
Adv Expense (millions)	351	68	831	0	4,000
Return on Assets	0.03	0.04	0.15	-0.52	0.27
Leverage Ratio	0.62	0.60	0.28	0.11	1.41
Book/Market Ratio	0.57	0.46	0.56	-1.48	2.94
Institutional Ownership	0.66	0.76	0.28	0.00	0.99
Number of Ads	118	22	398	1	1,944
Print Spend (Millions)	7.3	0.5	26.7	0.0	107.7
Number of Unique Brands	31	17	35	1	158
Number of Unique Titles	33	22	31	1	140

Panel C: Firm Averages by Calendar Month

	Ads	Titles	Readership (Mill)	Spend (Mil)
Jan	15.5	4.7	10.0	0.9
Feb	15.4	5.0	9.6	0.9
March	16.1	5.4	10.2	1.0
April	15.0	5.2	10.0	0.9
May	15.5	5.3	9.8	0.9
June	15.6	5.2	10.0	1.0
July	15.0	4.9	9.3	0.9
Aug	15.2	4.9	9.5	0.9
Sept	16.4	5.5	10.8	1.0
Oct	16.5	5.5	11.0	1.0
Nov	16.2	5.3	11.1	1.1
Dec	17.8	5.2	13.1	1.3

Panel D: Firm Averages by Calendar Year

	Ads	Titles	Readership (Mill)	Spend (Mil)
2007	41.9	5.9	53.9	5.8
2008	52.1	6.7	56.5	8.3
2009	84.1	8.2	84.4	7.0
2010	123.1	10.4	92.9	6.0
2011	159.0	12.2	90.7	6.6
2012	159.5	12.0	79.8	8.9
2013	124.5	11.1	64.4	7.7

Panel E: Firm Daily Averages by Day of Week

	Ads	Readership (Thousands)	Spend (Thousands)
Sun	0.33	249.96	32.79
Mon	0.71	654.55	74.73
Tues	0.16	114.52	4.77
Wed	0.27	134.96	5.59
Thur	0.32	176.17	11.87
Fri	0.42	224.49	16.19
Sat	0.17	123.20	3.96

Panel F: Percent of Firms by Industry - Top 15

	% of Firms
Business Services	9%
Retail	9%
Pharmaceutical Products	6%
Banking	6%
Insurance	4%
Communication	4%
Trading	4%
Machinery	4%
Electronic Equipment	4%
Entertainment	3%
Consumer Goods	3%
Apparel	3%
Computers	3%
Food Products	3%
Restaurants, Hotels	3%

Panel G: Percent of Ads by Industry - Top 15

	% of Total Ads	% of Total Spend
Communication	15%	14%
Printing and Publishing	13%	3%
Retail	10%	23%
Entertainment	8%	1%
Banking	6%	4%
Business Services	5%	4%
Pharmaceutical Products	5%	10%
Trading	5%	3%
Consumer Goods	4%	8%
Recreation	3%	1%
Automobiles and Trucks	3%	6%
Apparel	3%	3%
Insurance	2%	1%
Beer and Liquor	2%	2%
Restaurants, Hotels	2%	2%

Panel H: Number of Ads by Publication

	Ads	Freq	Start Date
The New York Times	50,317	Daily	January-09
Los Angeles Times	27,650	Daily	July-10
The Wall Street Journal	22,149	Daily	April-09
Chicago Tribune	18,223	Daily	February-11
The Miami Herald	13,411	Daily	January-11
People	12,902	Weekly	January-07
New York Post	12,753	Daily	June-09
Financial Times	11,197	Daily	June-09
Newsday	10,633	Daily	April-10
Las Vegas	8,443	Weekly	April-09
New York Daily News	7,850	Daily	January-10
USA Today	6,858	Daily	September-10
San Francisco Chronicle	6,648	Daily	March-11
The Seattle Times	5,871	Daily	January-07
Sports Illustrated	5,847	Weekly	August-10
Daily Record New Jersey	5,821	Daily	January-11
Us Weekly	5,548	Weekly	July-07
amNewYork	5,528	Daily	July-09
Fortune	5,165	Bi-Weekly	January-07
Time Out New York	4,966	Weekly	January-07
Time	4,926	Weekly	February-07
Entertainment Weekly	4,737	Weekly	January-07
Bloomberg Businessweek	4,635	Weekly	January-07
The Economist	4,542	Weekly	January-07
ESPN the Magazine	4,224	Bi-Weekly	January-07
Village Voice	4,120	Weekly	January-07
LA Weekly	4,008	Weekly	April-09
Las Vegas Weekly	3,967	Weekly	January-09
Forbes	3,953	Bi-Weekly	January-09
Barron's	3,803	Weekly	January-07

Panel I: Firm Daily Summary Statistics

	Firms	Mean	Median	SD	P99
Calendar Days	713	1,246	1,344	491	2,100
Google SVI	489	3.05	3.20	0.86	4.54
Trading Volume (Mill)	649	4.71	1.39	15.51	55.82
Ad Dummy	713	0.080	0	0.147	0.772
Number of Ads	713	0.207	0	0.807	5.257
Spend (Mill)	713	0.011	0	0.051	0.192
Readership (Mill)	713	0.190	0	0.948	2.727
Business Dummy	713	0.018	0	0.058	0.236
News Dummy	713	0.236	0	0.183	0.845

Table 2
Investor Attention

This table shows coefficient estimates from clustered panel regressions of log daily Google search volume index for a company's ticker (Google SVI), which has been shown to proxy for investors' attention. The sample period is 2007 to 2013 and includes publicly-traded firms with available advertising data from MediaRadar. We run various specifications of the regression below, where $Ad_{i,t}$ is one of several measures of a firm's daily print advertising activity defined in the column headers, $2DaysBeforeAd$ and $DayBeforeAd$ equal a firm's $Ad_{i,t}$ measure in one or two calendar days, respectively, and $DayAfterAd_{i,t}$, $2DaysAfterAd_{i,t}$, and $3to5DaysAfterAd_{i,t}$ equal the firm's $Ad_{i,t}$ measure from one, two, or three to five days earlier. $News\,Dummy_{i,t}$ is an indicator variable equal to one if firm i is mentioned in at least one news article on day t from any news source (taken from Ravenpack), $EA\,Day_{i,t}$ is an indicator variable equal to one if the firm announced earnings on day t and zero otherwise, and $EA\,Window_{i,t}$ is an indicator variable equal to one if the firm will announce earnings in 1 to 5 days or announced earnings over the previous 5 days, and zero otherwise. In Panel A, the primary explanatory variable of interest in columns (1) through (3) is *Ad Dummy*, an indicator variable equal to one if the firm placed at least one print ad on a given day and zero otherwise, and in columns (4) through (6) is *Business Dummy*, an indicator variable equal to one if the firm placed at least one print ad in a business publication on a given day and zero otherwise. We also split the sample by median institutional-investor ownership. Panel B explores three alternative measures of advertising activity: (1) *Ads*, the natural log plus 1 of ads placed each day, (2) *Spend*, natural log plus 1 of the total dollars spent on advertising each day, and (3) *Readership*, natural log plus 1 of the estimated distribution of the publications containing the advertisements, for general ads and ads printed in business publications. In Panel C we interact our advertising measures with days of the week. All regressions include day-of-week, year-month, and firm fixed effects. The intercepts are not reported. Standard errors are robust to heteroskedasticity and clustered at the firm level. T-statistics are reported in parentheses, and *,**, and *** indicate 10%, 5%, and 1% two-tailed statistical significance, respectively.

$$
\begin{aligned}
Google\,SVI_{i,t} &= \alpha + \beta_1 2DaysBeforeAd_{i,t} \\
&+ \beta_2 DayBeforeAd_{i,t} \\
&+ \beta_3 Ad_{i,t} \\
&+ \beta_4 DayAfterAd_{i,t} \\
&+ \beta_5 2DaysAfterAd_{i,t} \\
&+ \beta_6 3to5DaysAfterAd_{i,t} \\
&+ \gamma_1 News\,Dummy_{i,t} + \gamma_2 EA\,Dayi,t + \gamma_3 EA\,Windowi,t + \gamma_4 Holiday_t \\
&+ \delta\text{Firm FE} + \eta\text{Day-of-the-week FE} + \theta\text{Year-Month FE} + \epsilon_{i,t}
\end{aligned}
$$

Table 2 Panel A: Google Searches

Dependent variable: log(Google SVI)

	Ad Dummy			Business Dummy		
	All	Retail	Inst	All	Retail	Inst
Ad Measure	0.028***	0.020**	0.027**	0.037***	0.038***	0.026**
	(3.64)	(2.59)	(2.24)	(3.59)	(2.92)	(1.97)
News Dummy	0.034***	0.039***	0.030***	0.034***	0.039***	0.030***
	(7.21)	(5.37)	(5.72)	(7.22)	(5.37)	(5.74)
EA	0.142***	0.170***	0.115***	0.142***	0.170***	0.115***
	(7.16)	(5.43)	(6.50)	(7.16)	(5.43)	(6.49)
EA (t-5,t+5)	0.055***	0.062***	0.049***	0.055***	0.062***	0.049***
	(6.54)	(4.78)	(5.98)	(6.53)	(4.78)	(5.98)
Holiday	-0.084***	-0.089***	-0.078***	-0.084***	-0.089***	-0.078***
	(-7.49)	(-5.68)	(-5.82)	(-7.51)	(-5.67)	(-5.86)
Observations	496,285	248,219	248,066	496,285	248,219	248,066
Adj R-Squared	0.035	0.052	0.028	0.035	0.052	0.028
Day of Week FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 2 Panel B: Google Searches around the Ad Day

Dependent variable: log(Google SVI)

	Ad Dummy			Business Dummy		
	All	Retail	Inst	All	Retail	Inst
2 Days before Ad	0.004	-0.001	0.005	0.000	0.002	-0.005
	(0.76)	(-0.08)	(0.61)	(0.04)	(0.18)	(-0.41)
Day before Ad	0.008	0.001	0.012	-0.000	0.005	-0.018
	(1.49)	(0.10)	(1.29)	(-0.02)	(0.43)	(-1.11)
Ad Day	0.023***	0.019***	0.020**	0.036***	0.037***	0.026**
	(3.86)	(2.90)	(2.17)	(3.76)	(3.02)	(2.01)
Day after Ad	0.016***	0.013**	0.013*	0.030***	0.031**	0.025**
	(3.12)	(2.13)	(1.86)	(3.20)	(2.53)	(2.17)
2 Days after Ad	0.014**	0.006	0.020***	0.011	0.001	0.024**
	(2.49)	(0.87)	(2.72)	(1.02)	(0.07)	(2.36)
3-5 Days after Ad	0.005	0.003	0.009	0.001	-0.013	0.020
	(0.85)	(0.38)	(1.08)	(0.10)	(-1.19)	(1.46)
News Dummy	0.034***	0.039***	0.030***	0.034***	0.039***	0.030***
	(7.22)	(5.38)	(5.72)	(7.23)	(5.37)	(5.77)
EA	0.143***	0.171***	0.116***	0.143***	0.171***	0.116***
	(7.15)	(5.40)	(6.52)	(7.15)	(5.41)	(6.51)
EA (t-5,t+5)	0.055***	0.062***	0.049***	0.055***	0.062***	0.049***
	(6.52)	(4.75)	(5.97)	(6.52)	(4.74)	(5.97)
Holiday	-0.084***	-0.089***	-0.078***	-0.084***	-0.089***	-0.078***
	(-7.45)	(-5.66)	(-5.80)	(-7.49)	(-5.66)	(-5.85)
Observations	495,019	247,439	247,580	495,019	247,439	247,580
Adj R-Squared	0.036	0.052	0.028	0.035	0.052	0.028
Day of Week FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 2 Panel C: Google Searches: Company Tickers vs. Company Names

Dependent variable: log(Google SVI)

	Ad Dummy		Business Dummy	
	Ticker	Name	Ticker	Name
Ad Measure	0.028***	0.060***	0.037***	0.073***
	(3.64)	(4.22)	(3.59)	(4.42)
News Dummy	0.034***	0.044***	0.034***	0.044***
	(7.21)	(7.67)	(7.22)	(7.68)
EA	0.142***	0.077***	0.142***	0.077***
	(7.16)	(7.97)	(7.16)	(7.93)
EA (t-5,t+5)	0.055***	0.034***	0.055***	0.034***
	(6.54)	(5.88)	(6.53)	(5.87)
Holiday	-0.084***	-0.103***	-0.084***	-0.103***
	(-7.49)	(-5.75)	(-7.51)	(-5.74)
Observations	496,285	359,997	496,285	359,997
Adj R-Squared	0.035	0.059	0.035	0.058
Day of Week FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes

Table 3
Investor Attention

This table shows coefficient estimates from clustered panel regressions of log daily Google search volume index for a company's ticker (Google SVI), which has been shown to proxy for investors' attention. The sample period is 2007 to 2013 and includes publicly-traded firms with available advertising data from MediaRadar. We run various specifications of the regression below, where $Ad_{i,t}$ is one of several measures of a firm's daily print advertising activity defined in the column headers, $2DaysBeforeAd$ and $DayBeforeAd$ equal a firm's $Ad_{i,t}$ measure in one or two calendar days, respectively, and $DayAfterAd_{i,t}$, $2DaysAfterAd_{i,t}$, and $3to5DaysAfterAd_{i,t}$ equal the firm's $Ad_{i,t}$ measure from one, two, or three to five days earlier. $News\,Dummy_{i,t}$ is an indicator variable equal to one if firm i is mentioned in at least one news article on day t from any news source (taken from Ravenpack), $EA\,Day_{i,t}$ is an indicator variable equal to one if the firm announced earnings on day t and zero otherwise, and $EA\,Window_{i,t}$ is an indicator variable equal to one if the firm will announce earnings in 1 to 5 days or announced earnings over the previous 5 days, and zero otherwise. In Panel A, the primary explanatory variable of interest in columns (1) through (3) is *Ad Dummy*, an indicator variable equal to one if the firm placed at least one print ad on a given day and zero otherwise, and in columns (4) through (6) is *Business Dummy*, an indicator variable equal to one if the firm placed at least one print ad in a business publication on a given day and zero otherwise. We also split the sample by median institutional-investor ownership. Panel B explores three alternative measures of advertising activity: (1) *Ads*, the natural log plus 1 of ads placed each day, (2) *Spend*, natural log plus 1 of the total dollars spent on advertising each day, and (3) *Readership*, natural log plus 1 of the estimated distribution of the publications containing the advertisements, for general ads and ads printed in business publications. In Panel C we interact our advertising measures with days of the week. All regressions include day-of-week, year-month, and firm fixed effects. The intercepts are not reported. Standard errors are robust to heteroskedasticity and clustered at the firm level. T-statistics are reported in parentheses, and *,**, and *** indicate 10%, 5%, and 1% two-tailed statistical significance, respectively.

$$
\begin{aligned}
Google\,SVI_{i,t} &= \alpha + \beta_1 2DaysBeforeAd_{i,t} \\
&+ \beta_2 DayBeforeAd_{i,t} \\
&+ \beta_3 Ad_{i,t} \\
&+ \beta_4 DayAfterAd_{i,t} \\
&+ \beta_5 2DaysAfterAd_{i,t} \\
&+ \beta_6 3to5DaysAfterAd_{i,t} \\
&+ \gamma_1 News\,Dummy_{i,t} + \gamma_2 EA\,Dayi,t + \gamma_3 EA\,Windowi,t + \gamma_4 Holiday_t \\
&+ \delta\text{Firm FE} + \eta\text{Day-of-the-week FE} + \theta\text{Year-Month FE} + \epsilon_{i,t}
\end{aligned}
$$

Table 3 Panel A: Google Searches by Day of the Week

Dependent variable: log(Google SVI)

	Ad Dummy			Business Dummy		
	All	Retail	Inst	All	Retail	Inst
Ad Measure	0.009	-0.008	0.020	0.009	-0.003	0.026
	(0.80)	(-0.62)	(1.15)	(0.53)	(-0.15)	(1.34)
Ad Measure × Mon	0.018	0.031**	-0.003	0.030	0.037*	0.003
	(1.61)	(2.57)	(-0.21)	(1.49)	(1.73)	(0.10)
Ad Measure × Wed	0.003	0.018	-0.012	0.012	0.030	-0.021
	(0.28)	(1.58)	(-0.88)	(0.67)	(1.44)	(-1.05)
Ad Measure × Thu	0.013	0.029**	-0.007	0.029	0.049**	-0.014
	(1.30)	(2.27)	(-0.45)	(1.54)	(2.13)	(-0.59)
Ad Measure × Fri	0.010	0.008	0.010	-0.000	0.010	-0.018
	(0.92)	(0.55)	(0.67)	(-0.01)	(0.31)	(-0.53)
Ad Measure × Sat	0.044*	0.070**	0.012	0.114***	0.134***	0.115**
	(1.76)	(2.09)	(0.36)	(3.15)	(2.87)	(2.47)
Ad Measure × Sun	0.051**	0.068**	0.041			
	(2.39)	(2.33)	(1.49)			
Ad Measure × Holiday	0.028	0.003	0.065**	0.064**	0.097***	0.027
	(1.50)	(0.12)	(2.32)	(2.40)	(2.68)	(0.73)
Mon	-0.010***	-0.012***	-0.007**	-0.009***	-0.010***	-0.008***
	(-4.10)	(-3.66)	(-2.19)	(-4.29)	(-3.45)	(-2.65)
Wed	-0.004*	-0.007**	-0.002	-0.004**	-0.006*	-0.002
	(-1.79)	(-1.97)	(-0.80)	(-2.11)	(-1.87)	(-1.25)
Thu	-0.006**	-0.007	-0.004*	-0.005*	-0.005	-0.004**
	(-2.01)	(-1.58)	(-1.79)	(-1.86)	(-1.21)	(-2.06)
Fri	-0.017***	-0.012*	-0.022***	-0.016***	-0.012**	-0.021***
	(-3.97)	(-1.90)	(-5.09)	(-4.03)	(-2.00)	(-5.00)
Sat	-0.114***	-0.130***	-0.097***	-0.115***	-0.130***	-0.098***
	(-8.03)	(-6.12)	(-6.44)	(-8.31)	(-6.40)	(-6.64)
Sun	-0.125***	-0.146***	-0.103***			
	(-7.89)	(-6.15)	(-6.26)			
Holiday	-0.086***	-0.089***	-0.082***	-0.087***	-0.093***	-0.080***
	(-7.39)	(-5.44)	(-5.99)	(-7.54)	(-5.76)	(-5.88)
Observations	496,285	248,219	248,066	426,147	212,573	213,574
Adj R-Squared	0.035	0.052	0.028	0.030	0.046	0.025
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 Panel B: Google Searches: Business Ads vs. Regular Ads

Dependent variable: log(Google SVI)

	All	Retail	Inst
Weekday Ad	0.012	-0.002	0.017
	(1.22)	(-0.16)	(1.07)
Weekend Ad	0.052***	0.051**	0.049**
	(2.96)	(2.23)	(2.03)
Weekday Business Ad	0.023	0.034**	0.008
	(1.63)	(2.08)	(0.41)
Weekend Business Ad	0.069***	0.074**	0.090**
	(2.71)	(2.47)	(2.40)
Holiday	-0.084***	-0.089***	-0.078***
	(-7.46)	(-5.65)	(-5.83)
News Dummy	0.034***	0.040***	0.030***
	(7.26)	(5.43)	(5.74)
EA	0.142***	0.170***	0.115***
	(7.15)	(5.43)	(6.49)
EA (t-5,t+5)	0.055***	0.062***	0.049***
	(6.53)	(4.78)	(5.98)
Observations	496,285	248,219	248,066
Adj R-Squared	0.035	0.052	0.028
Day of Week FE	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Table 4
Advertising and Stock Returns

This table shows coefficient estimates from clustered panel regressions of daily returns. The sample period is 2007 to 2013 and includes publicly-traded firms with available advertising data from MediaRadar. We run the regression below, where our dependent variable $Ret_{i,[t,t+k]}$ is the raw return of company i over days t through $t+k$. Our explanatory variables include $Weekend\,Ad$, an indicator set to one on the first trading day of each week if the company placed an ad over the previous weekend, $Week\,Day$, an indicator set to one if the company had at least one ad in our sample on day t and zero otherwise, $WeekRet_{i,t}$, the raw return for company i for days $t-5$ to $t-1$, and $News\,Dummy$, an indicator set to one if the company was mentioned in the news on a given day. In Panel B we run our regressions separately for companies that had a negative (positive) stock return in the prior week. In Panel C we split our sample by median institutional ownership. All regressions include year, month, day-of-week, and firm fixed effects. The intercepts are not reported. Standard errors are robust to heteroskedasticity and clustered at the date level. T-statistics are reported in parentheses, and *,**, and *** indicate 10%, 5%, and 1% two-tailed statistical significance, respectively.

$$\begin{aligned} Ret_{i,[t,t+k]} &= \alpha + \beta_1 Weekend\,Ad_{i,t} + \beta_2 Weekday\,Ad_{i,t} + \beta_3 WeekRet_{i,t} + \beta_4 News\,Dummy_{i,t} \\ &+ \lambda\text{Year FE} + \mu\text{Month FE} + \eta\text{Day-of-the-week FE} + \zeta\text{Firm FE} + \epsilon_{i,t} \end{aligned}$$

Table 4 Panel A: Market Reaction

	Ret[-1,-1]	Ret[0,0]	Ret[0,1]	Ret[0,2]
Weekend Ad	0.000	-0.001**	-0.001*	-0.001
	(0.84)	(-2.09)	(-1.87)	(-1.29)
Weekday Ad	0.000	-0.000	0.000	0.000
	(0.44)	(-0.13)	(0.32)	(0.51)
Week Ret	-0.022***	-0.022***	-0.037***	-0.054***
	(-2.92)	(-2.88)	(-4.05)	(-4.49)
News Dummy	0.000**	0.001***	0.001***	0.000*
	(2.33)	(3.84)	(3.26)	(1.87)
Observations	442,496	443,093	425,263	407,469
Adj R-Squared	0.008	0.007	0.013	0.019
Year FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Day of Week FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes

Table 4 Panel B: Positive vs. Negative News

	Week Ret < 0				Week Ret > 0			
	Ret[-1,-1]	Ret[0,0]	Ret[0,1]	Ret[0,2]	Ret[-1,-1]	Ret[0,0]	Ret[0,1]	Ret[0,2]
Weekend Ad	0.0000	0.0002	-0.0000	-0.0005	0.0003	-0.0012***	-0.0014***	-0.0008
	(0.07)	(0.54)	(-0.06)	(-0.56)	(0.75)	(-2.98)	(-2.99)	(-1.32)
Weekday Ad	-0.0001	0.0000	-0.0001	0.0002	0.0002	0.0001	0.0002	0.0002
	(-0.39)	(0.07)	(-0.19)	(0.41)	(0.65)	(0.29)	(0.79)	(0.55)
Week Ret	-0.0470**	-0.0474**	-0.0716***	-0.1183***	-0.0152**	-0.0152**	-0.0221**	-0.0230*
	(-2.39)	(-2.42)	(-3.54)	(-4.15)	(-2.06)	(-2.07)	(-2.03)	(-1.79)
News Dummy	0.0003	0.0001	0.0003	0.0001	0.0005***	0.0006***	0.0007***	0.0005**
	(1.59)	(0.51)	(1.17)	(0.32)	(2.80)	(4.18)	(3.39)	(2.14)
Observations	203,273	203,026	195,941	187,732	239,469	239,819	229,321	219,736
Adj R-Squared	0.012	0.013	0.018	0.026	0.007	0.006	0.012	0.021
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day of Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4 Panel C: Institutions vs. Retail

	Week Ret > 0 and Retail				Week Ret > 0 and Institutional			
	Ret[-1,-1]	Ret[0,0]	Ret[0,1]	Ret[0,2]	Ret[-1,-1]	Ret[0,0]	Ret[0,1]	Ret[0,2]
Weekend Ad	0.0003	-0.0005	-0.0012*	-0.0007	0.0002	-0.0014***	-0.0015**	-0.0006
	(0.82)	(-0.97)	(-1.95)	(-0.77)	(0.41)	(-2.85)	(-2.28)	(-0.65)
Weekday Ad	0.0003	0.0004	0.0007*	0.0007	0.0001	-0.0001	-0.0000	-0.0003
	(0.98)	(1.52)	(1.89)	(1.38)	(0.26)	(-0.35)	(-0.07)	(-0.62)
Week Ret	-0.0159**	-0.0064	-0.0060	0.0047	-0.0161*	-0.0166*	-0.0241**	-0.0274**
	(-2.18)	(-0.82)	(-0.46)	(0.28)	(-1.80)	(-1.86)	(-2.12)	(-2.09)
News Dummy	0.0005**	0.0007***	0.0011***	0.0011***	0.0004**	0.0005***	0.0004*	0.0002
	(2.46)	(3.65)	(4.00)	(2.68)	(2.11)	(2.74)	(1.66)	(0.65)
Observations	108,889	108,681	104,304	96,463	130,580	130,885	125,204	119,985
Adj R-Squared	0.009	0.007	0.018	0.038	0.006	0.005	0.012	0.021
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day of Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5
Advertising and Earnings Announcements

This table shows coefficient estimates from clustered panel regressions of weekly advertising activity. The sample period is 2007 to 2013 and includes all publicly-traded firms with available advertising data from MediaRadar. In panel A our dependent variable is an indicator variable set to one if the firm placed an ad during a given week, and in Panel B the dependent variables are continuous measures of weekly advertising activity: *Ads*, the natural log plus 1 of the number of print ads placed during a week, *Readership*, natural log plus 1 of the estimated distribution of the publications containing the advertisements, and *Spend*, natural log plus 1 of the total dollars spent on advertising each week. Our explanatory variables are indicators for various weeks surrounding an earnings announcement week. For instance, $Pos\,Earnings_{i,t+2}$ is equal to one if the firm will announce earnings in two weeks which will be above or equal to the median analyst forecast, whereas $Neg\,Earnings_{i,t+2}$ is equal to one if the firm will announce earnings in two weeks which will be below the median analyst forecast. We also separate firms by institutional ownership (below and above the median). All regressions include year-month and firm fixed effects. The intercepts are not reported. Standard errors are robust to heteroskedasticity and clustered at the firm level. T-statistics are reported in parentheses, and *,**, and *** indicate 10%, 5%, and 1% two-tailed statistical significance, respectively.

$$
\begin{aligned}
Ad_{i,t} &= \alpha + \beta_1 Pos\,Earnings_{i,t-2} + \beta_2 Pos\,Earnings_{i,t-1} + \beta_3 Pos\,Earnings_{i,t} \\
&+ \beta_4 Pos\,Earnings_{i,t+1} + \beta_5 Pos\,Earnings_{i,t+2} + \beta_6 Pos\,Earnings_{i,t+3} \\
&+ \beta_7 Pos\,Earnings_{i,t+4} + \beta_8 Pos\,Earnings_{i,t+5} + \beta_9 Pos\,Earnings_{i,t+6} \\
&+ \gamma_1 Neg\,Earnings_{i,t-2} + \gamma_2 Neg\,Earnings_{i,t-1} + \gamma_3 Neg\,Earnings_{i,t} \\
&+ \gamma_4 Neg\,Earnings_{i,t+1} + \gamma_5 Neg\,Earnings_{i,t+2} + \gamma_6 Neg\,Earnings_{i,t+3} \\
&+ \gamma_7 Neg\,Earnings_{i,t+4} + \gamma_8 Neg\,Earnings_{i,t+5} + \gamma_9 Neg\,Earnings_{i,t+6} \\
&+ +\lambda \text{FEs} + \epsilon_{i,t}
\end{aligned}
$$

Table 4 Panel A: Earnings Announcements

	All	Retail	Inst
Pos. Earnings (t+2)	-0.003	-0.010	0.003
	(-0.67)	(-1.39)	(0.50)
Pos. Earnings (t+1)	0.009**	0.012*	0.010
	(1.99)	(1.83)	(1.62)
Pos. Earnings (t)	0.011**	0.018**	0.010*
	(2.41)	(2.47)	(1.66)
Pos. Earnings (t-1)	0.013***	0.012*	0.016***
	(2.82)	(1.81)	(2.82)
Pos. Earnings (t-2)	0.009*	0.012*	0.009
	(1.77)	(1.72)	(1.48)
Pos. Earnings (t-3)	0.005	0.009	0.006
	(1.18)	(1.28)	(1.07)
Pos. Earnings (t-4)	0.004	0.000	0.008
	(0.82)	(0.05)	(1.39)
Neg. Earnings (t+2)	0.004	0.008	0.004
	(0.55)	(0.61)	(0.44)
Neg. Earnings (t+1)	0.003	0.001	0.008
	(0.42)	(0.07)	(0.73)
Neg. Earnings (t)	-0.000	0.005	-0.000
	(-0.03)	(0.43)	(-0.05)
Neg. Earnings (t-1)	-0.003	-0.023**	0.016
	(-0.34)	(-2.08)	(1.45)
Neg. Earnings (t-2)	-0.001	-0.008	0.008
	(-0.13)	(-0.79)	(0.85)
Neg. Earnings (t-3)	0.009	0.016	0.007
	(1.11)	(1.26)	(0.74)
Neg. Earnings (t-4)	-0.003	0.006	-0.005
	(-0.34)	(0.51)	(-0.42)
Observations	202,847	78,103	124,744
Adj R-Squared	0.059	0.063	0.053
Year-Month FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Table 4 Panel B: Alternative Advertising Measures

	Ads	Readership	Spend
Pos. Earnings (t+2)	0.003	-0.023	-0.051
	(0.41)	(-0.37)	(-0.96)
Pos. Earnings (t+1)	0.017**	0.105*	0.082*
	(2.35)	(1.79)	(1.65)
Pos. Earnings (t)	0.016**	0.142**	0.117**
	(2.17)	(2.35)	(2.25)
Pos. Earnings (t-1)	0.018**	0.167***	0.083
	(2.36)	(2.75)	(1.59)
Pos. Earnings (t-2)	0.011	0.118*	0.112**
	(1.55)	(1.82)	(2.04)
Pos. Earnings (t-3)	0.013*	0.100*	0.107**
	(1.90)	(1.67)	(1.97)
Pos. Earnings (t-4)	0.012*	0.081	0.051
	(1.75)	(1.38)	(1.00)
Pos. Earnings (t-5)	-0.001	0.005	-0.013
	(-0.13)	(0.09)	(-0.27)
Neg. Earnings (t+2)	-0.018	0.012	-0.046
	(-1.54)	(0.11)	(-0.55)
Neg. Earnings (t+1)	-0.017	0.020	-0.087
	(-1.44)	(0.19)	(-1.02)
Neg. Earnings (t)	-0.016	-0.017	-0.026
	(-1.38)	(-0.17)	(-0.31)
Neg. Earnings (t-1)	-0.029**	-0.062	-0.075
	(-2.39)	(-0.60)	(-0.88)
Neg. Earnings (t-2)	-0.014	0.003	-0.018
	(-1.24)	(0.03)	(-0.23)
Neg. Earnings (t-3)	-0.012	0.061	0.057
	(-1.05)	(0.61)	(0.68)
Neg. Earnings (t-4)	-0.020*	-0.071	-0.024
	(-1.66)	(-0.72)	(-0.28)
Neg. Earnings (t-5)	-0.024**	-0.115	-0.067
	(-2.20)	(-1.25)	(-0.81)
Observations	198,883	198,883	198,883
Adj R-Squared	0.136	0.062	0.050
Year-Month FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Table 6
Advertising and Earnings Announcement Returns

This table reports tests of the effect of advertising on the relation between announcement returns and earnings surprises. The dependent variable is the cumulative abnormal return over event days 0 and 1. *EarningsQuintile* is a scaled rank variable, based on independent quarterly sorts of the firm's earnings surprise (announced earnings minus median analyst consensus forecast scaled by stock price). *HighSpend* is an indicator variable set to one if the firm's abnormal advertising spend over event days [0,1] are above that quarter's sample median. Abnormal advertising is defined as dollars spent on advertising over event days [0,1] minus average spending over the previous 12 weeks for the same days of the week. Control variables include quintile ranks of size, book-to-market, earnings surprise volatility (measured over the past 4 years), institutional ownership, as well as log(1+ # analysts), reporting lag, and reporting lag squared. All regressions include year, month, day-of-week, and industry fixed effects. The intercepts are not reported. Standard errors are robust to heteroskedasticity and clustered at the date level. T-statistics are reported in parentheses, and *,**, and *** indicate 10%, 5%, and 1% two-tailed statistical significance, respectively.

$$\begin{aligned} CAR[0,t] &= \alpha + \beta_1 Earnings\,Quintile + \beta_2 High\,Spend + \beta_3 Earnings \times High\,Spend \\ &+ \gamma \text{Controls} + \lambda \text{FEs} + \epsilon_{i,t} \ , \end{aligned}$$

Table 5: Dependent Variable is CAR[0,1]

	All	Low Earn	High Earn	Low Earn		High Earn	
				Retail	Inst	Retail	Inst
Earnings Quintile	0.032***						
	(16.98)						
High Spend	-0.007**	-0.002	0.011**	0.006	-0.011**	0.009	0.010*
	(-2.57)	(-0.50)	(2.50)	(0.90)	(-2.17)	(1.52)	(1.87)
Earnings * High Spend	0.009***						
	(3.65)						
Size	-0.002***	0.003	-0.009***	0.004	0.006**	-0.007**	-0.010***
	(-2.91)	(1.38)	(-4.22)	(1.40)	(2.14)	(-2.40)	(-3.49)
Book-to-Market	-0.002**	0.004**	-0.004**	0.006**	0.002	-0.001	-0.004
	(-2.36)	(2.29)	(-2.05)	(2.31)	(0.83)	(-0.28)	(-1.60)
Earnings Volatility	-0.003***	-0.005***	-0.003	-0.006**	-0.005**	-0.005	-0.002
	(-4.07)	(-2.72)	(-1.49)	(-2.52)	(-2.05)	(-1.44)	(-0.77)
Inst. Ownership	-0.000	-0.003*	0.000				
	(-0.62)	(-1.93)	(0.17)				
Reporting Lag	0.001*	0.001	0.002*	0.004**	-0.000	0.001	0.002
	(1.65)	(1.23)	(1.89)	(2.54)	(-0.12)	(0.80)	(1.31)
Reporting Lag Squared	-0.000*	-0.000	-0.000**	-0.000**	0.000	-0.000	-0.000*
	(-1.72)	(-1.16)	(-2.07)	(-2.09)	(0.38)	(-0.47)	(-1.89)
Log Analysts	-0.001	0.002	-0.002	0.005	-0.002	-0.005	0.001
	(-0.37)	(0.55)	(-0.49)	(0.85)	(-0.43)	(-0.70)	(0.14)
Observations	11644	2224	2265	1029	1404	978	1479
Adj R-Squared	0.118	0.032	0.070	0.027	0.022	0.049	0.058
Day of Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FF48 Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A1
Google Searches: Alternative Advertising Measures

	General Ads			Business Ads		
	Ads	Spend	Readership	Business	Spend	Readership
Ad Measure(t-2)	0.004	0.000	0.000	0.001	-0.001	-0.000
	(0.85)	(0.10)	(0.77)	(0.12)	(-0.50)	(-0.00)
Ad Measure(t-1)	0.008*	0.001	0.001	-0.000	0.000	-0.000
	(1.69)	(1.48)	(1.49)	(-0.01)	(0.43)	(-0.18)
Ad Measure	0.021***	0.003***	0.002***	0.040***	0.004***	0.002***
	(3.77)	(3.57)	(3.83)	(3.68)	(4.39)	(3.35)
Ad Measure(t+1)	0.015***	0.002***	0.001***	0.032***	0.004***	0.002***
	(3.24)	(2.93)	(3.01)	(2.68)	(3.63)	(2.88)
Ad Measure(t+2)	0.015***	0.001*	0.001**	0.013	0.002	0.001
	(3.04)	(1.85)	(2.40)	(1.11)	(1.56)	(0.95)
Ad Measure(t+3:t+5)	0.005	0.001	0.005	0.000	-0.007	0.001
	(0.71)	(0.19)	(0.84)	(0.00)	(-0.65)	(0.12)
News Dummy	0.034***	0.035***	0.034***	0.035***	0.035***	0.034***
	(7.23)	(7.04)	(7.22)	(7.24)	(7.24)	(7.23)
EA	0.143***	0.136***	0.143***	0.143***	0.143***	0.143***
	(7.15)	(7.09)	(7.16)	(7.15)	(7.14)	(7.15)
EA (t-5,t+5)	0.055***	0.054***	0.055***	0.055***	0.055***	0.055***
	(6.51)	(6.42)	(6.52)	(6.52)	(6.52)	(6.52)
Holiday	-0.084***	-0.085***	-0.084***	-0.084***	-0.084***	-0.084***
	(-7.48)	(-7.28)	(-7.46)	(-7.48)	(-7.53)	(-7.50)
Observations	495,019	425,204	495,019	495,019	495,019	495,019
Adj R-Squared	0.036	0.036	0.036	0.035	0.035	0.035
Day of Week FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes