Advertising Exposure and Investor Attention: Estimates from Super Bowl Commercials*

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Abstract

Product advertising captures the attention not only of consumers but also of investors. Constructing a measure of local investment interest in stocks from Google searches and using the Super Bowl as an experiment, we study the effects of advertising expenses on investor attention. We find that the post-game Monday attention of investors in areas with high viewership increases significantly for both local and non-local companies that air commercials. Non-local firms with high advertising exposure in a region attract more interest than local firms with low exposure, suggesting that advertising has a stronger impact on investor attention than the local bias.

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1. Introduction

Product advertising is a widely discussed source for households' investment ideas. US-listed companies spend annually about 200 billion dollars on advertising to signal high product quality and good financial prospects (Milgrom and Roberts (1986)). Based on that premise, economists have documented large positive effects of a firm's advertising expenses on its retail stock demand, using aggregate (Grullon, Kanatas, and Weston (2004), Lou (2014)) and micro-level investment data (Branikas (2019)). Between the exposure to product advertisement and the portfolio choice, there is the intermediate stage of paying more attention to the stock of the advertising firm.

There is a growing literature on the impact of ads on investors' attention based on data that could approximate their consideration sets. As is the case for any study on the effects of advertising, the main identification challenge is that marketing activities are likely to be correlated with a host of firm characteristics (e.g., sales, profitability, phase in the industry life cycle, product launches, and news coverage), which can also influence investors' attention. For instance, Chemmanur and Yan (2019) find a positive relation between the change in a firm's annual advertising expenditure and the change in the number of analysts covering its stock, controlling for the one year-lag levels of these variables, financial characteristics, and the changes in sales and profits.

High frequency (e.g., daily) data may allow to better control for firm characteristics, especially those that are fixed during a longer period of time. Madsen and Niessner (2019) utilize a firm's propensity to advertise at weekly intervals in the print media to show that its daily newspaper advertisements increase the searches for its stock ticker on Google.[1] Focke, Ruenzi, and Ungeheuer (2019) use a distributed lag model of three days to show that a firm's advertising activity on TV or print media also raises the number of its Wikipedia page views, the downloads of its filings from the SEC's EDGAR platform, and the searches for its stock

[1] Upon this evidence, Fang, Madsen, and Shao (2020) use the advertisements of publicly traded firms in The Wall Street Journal as a proxy for noise trading.

on Bloomberg. Mayer (2019) uses the variation in the national TV ratings and the margins of victory across college football bowl games to show that, on the post-game day, corporate sponsors see an increase in the Google searches for their tickers relative to other firms with similar characteristics.

In this paper, we use geographic variation in the exposure to advertising to estimate its impact on investor attention *within the same firm – advertising event*. We can thus account for any heterogeneity between advertising and non-advertising firms during the event period. Our work also complements the recent findings of Liaukonyte and Zaldokas (2019), who, using the different U.S. time zones, show that a company's TV commercials in time-shifted programs increase its EDGAR queries and Google searches, within the same firm – 15-minute interval. Their identification strategy relies on a firm not advertising at hours of the day when its potential or actual investors are more likely to search for it. This assumption is absent in our framework, since we study stock searches on the day after a live TV advertising event with a large nationwide exposure.

Additionally, we study how advertising interacts with the local bias in equity preferences. Households load their portfolios with shares of companies whose headquarters are near their residence independently of their advertising spending (e.g., Grinblatt and Keloharju (2001), Branikas, Hong, and Xu (2019)), and, in fact, research these companies more in the first place (Gargano and Rossi (2018)).[2] Our goal is therefore to investigate whether the advertisements of geographically distant firms can actually make the attention of retail investors less regional.

For our analysis, we use the Super Bowl (i.e., the NFL's annual championship game) as a natural experiment that generates random exposure to advertising.[3] The Super Bowl is the biggest advertising event in the U.S., being watched by approximately 100 million individuals every year. As displayed in Figure 1, the price to air a 30-second commercial during the game currently starts at 5 million dollars, which not only overwhelmingly exceeds

[2]See, also, Huberman (2001), Demarzo, Kaniel, and Kremer (2004), and Seasholes and Zhu (2010).

[3]Waterhouse (2003) and Fehle, Tsyplakov, and Zdorovtsov (2005) are among the first authors to study the effects of Super Bowl commercials on stock returns and aggregate trading activity.

the cost to advertise in any other (pre- or post-game) show on that day, but is in fact higher than the average annual advertising expenditure on TV every 30 minutes. Every year, about 14 publicly traded companies in the S&P500 Index pay this very expensive rate, airing one or multiple ads.

The advertising exposure of investors to these companies is not the same nationwide, as indicated by the variation in the Super Bowl viewership ratings in local markets provided by Nielsen. Based on this remark, we capture the advertising exposure of a designated market area (DMA) to a given firm by interacting an indicator variable that equals one if the firm airs a Super Bowl ad with the viewership in the respective DMA. This interaction variable expresses the fraction of the DMA's population that watches the firm's advertisements. To construct it, we hand collect data on the Super Bowl commercials for the period 2011-2018 from the USA Today Ad Meter.

Following the methodology of Buchbinder (2019), we use data from Google Trends to construct a measure of local investor attention on the stocks of the Super Bowl advertisers and other members of the S&P500 Index in Nielsen's top 56 metered markets. Our measure estimates for each DMA the relative investment interest in a given stock, based on the Google searches for the name of its company followed by the word "stock". As shown by the author, this "Name of Company + Stock" - based measure is preferable to the measure based on searches for tickers (proposed originally by Da, Engelberg, and Gao (2011)), since (i) it reflects more naturally a household's stock searches (especially the initial ones), (ii) it allows us to keep in the sample stocks with noisy tickers, such as tickers that have double meanings (e.g., SEE) or coincide with the company name (e.g., AON), and (iii) it exhibits a stronger local bias.

Equipped with data on the local investment interest and advertising exposure, we use stock-year fixed effects in our regressions to account for the possibility that the stocks of companies which advertise in the Super Bowl in a given year could be fundamentally different from the ones that do not. A related omitted variables issue would be that firms air

Super Bowl commercials to cater to their customer and investor bases that watch the game. However, according to reports extracted from AdAge (shown in Table 1), at least 90% of the ad slots are sold one month before the Super Bowl, and therefore prior to the the start of the NFL playoffs. Linear probability regressions of a firm's Super Bowl advertising on the Super Bowl viewership in the DMA where it is headquartered, or the odds-based expected or actual Super Bowl appearance of a local team support the conjecture that companies advertise in the Super Bowl primarily to increase their exposure at the national level.

For us, an important endogeneity concern is reverse causality since, when companies advertise during highly viewed events such as the Super Bowl, investors, analysts, and brokers may tune in to watch the ads of companies whose stocks they are already tracking.[4] We thus follow Stephens-Davidowitz, Varian, and Smith (2017) and use as an instrument for a DMA's viewership the appearance of its local team in the game. Our exclusion restriction is that the presence of a DMA's team in the Super Bowl does not change its households' stock searches for any reason other than their higher exposure to commercials while they are watching the game as fans.

Our first-stage regression shows indeed that the Super Bowl appearance of a local team is the strongest predictor of a DMA's viewership. Subsequently, in our 2SLS regression, we find that a one standard deviation increase in the advertising exposure increases the post-Super Bowl Monday DMA investor attention by a factor of 1.7 relative to the average. The effect is both economically and statistically significant, and indicates the power of advertising in the Super Bowl.

There are at least two scenarios in which our exclusion restriction might fail. First, the Super Bowl appearance of a DMA's local team might alter the risk preferences or expectations of its households, which could affect searches through a channel other than the advertising exposure. For instance, consider a case where households whose local team is playing in the Super Bowl become overoptimistic. This may make them more interested in

[4] See, e.g., MW Blogs, "Should you buy stocks of companies that advertise during the Super Bowl?", *MarketWatch*, February 1, 2013.

participating in the stock market, and, consequently, more likely to search for the stocks of companies that advertise during the game. But then, under that setup, one would also expect a variation between the households' stock searches in these DMAs on the post-Super Bowl Monday based on whether their local team won the game or not. Yet, as we show below, winning the Super Bowl does not affect investors' attention in the DMAs with a local team in the game.

A second scenario that may invalidate our exclusion restriction is if the Super Bowl appearance of a local team in a DMA affects an investor's attention not only through the higher viewership but also through intermediaries. For example, local analysts or brokers in the DMAs with a local team in the game are exposed to the commercials of the Super Bowl advertisers, and might promote their stocks to their clients on the post-game day as investment ideas. Similarly, peer groups could discuss the Super Bowl ads, and therefore might influence investors on top of their direct advertising exposure. We thus repeat our analysis after omitting DMAs with a high fraction of finance industry employees, or a high level of Social Capital Index. In these subsamples of DMAs, our exclusion restriction is even more sound and the estimated advertising effect is actually sharper.

We also examine whether the advertising effect that we identify is driven by pre-trends. For example, during the week before the game, households may encounter in their readings references about the Super Bowl commercials, and therefore search for the stocks of the advertising companies. Although this seems plausible, it is unlikely to be as important as the exposure to these ads while watching the game. Indeed, placebo regressions using the pre-game Friday and Monday DMA stock searches yield statistically insignificant results.

In the same spirit, we test whether the advertising effect on investor attention persists after the post-Super Bowl Monday. In the regressions where we use as dependent variables the local investment interest on the post-Super Bowl Tuesday or Friday, the estimated coefficient of the advertising exposure is not statistically different from zero. In other words, our findings suggest that the exposure to the Super Bowl commercials has only a one-day impact on the households' stock searches.

Despite its short life, the magnitude of the advertising effect on investors' attention is sizable, and about six times higher than the the effect of reducing the distance of a firm's headquarters from a DMA by half. Our next step is therefore to study how advertising interacts with a firm's geographical proximity. For each DMA, we classify firms as local or non-local, and as having high or low advertising exposure.

Consistent with our results above, we show that the investment interest is higher for firms with high advertising exposure than for firms with low exposure, independently of whether these are local or non-local. Most interestingly, the investment interest for non-local firms with high exposure is also higher than the interest for local firms with low exposure. In other words, Super Bowl advertising substitutes the bias against the stocks of distant firms.

Furthermore, for the case in which both local and non-local firms have high advertising exposure, we investigate if the searches for local firms are higher than the searches for non-local firms. That is, does geographical proximity amplify the advertising effect? It turns out that this depends on the narrowness of the distance threshold based on which a firm's locality is defined. If it is short (e.g., 100 miles), then the increase in attention from high exposure is higher for the local firms. Otherwise (e.g., for the distance threshold of 250 miles), the increase in attention is higher for the non-local firms.

We also consider a finer distinction of a firm's proximity, and show that the highest increases in the investment interest from advertising occur for the nearest local firms. The increases in the searches for the distant firms come second, while the increases in searches for the less local but not too distant firms come last. Hence, proximity augments the effect of advertising exposure only for relatively short distances.

In sum, our findings suggest that product advertising has a strong impact on investors' attention, which could be even more important than the local bias. Since households typically do not short, their increased attention to the advertising firms raises the probability of their stock purchases.[5] However, whether households' investments will actually take place depends on their information and transaction costs (e.g., Rossi (2010), Abel, Eberly, and Panageas (2013)) as well as their expectations after they conduct their research on stocks. Decomposing the effect of product advertising on investors' consideration sets and portfolios, with data on both their searches and stockholdings, is a very interesting topic for future study.

2. Data

This data section is divided into four subsections. First, we outline some details about the Super Bowl and the market for its advertisement slots. Next, we describe the financial characteristics of the Super Bowl advertisers, and compare them to the ones of other firms in the investment universe. Then, we describe the Super Bowl viewership and the demographics in the designated market areas (DMAs). Finally, we introduce our measure for the local investment interest, which we construct based on Google searches for stocks in the DMAs.

2.1. The Super Bowl advertisement market

About 100 million individuals watch the Super Bowl every year, making it the biggest advertising event in the U.S. The distribution of the advertisement slots is decided by the network that broadcasts the game. Since 2006, there has been a three-network rotation between CBS, NBC and Fox. Long before the kickoff of the Super Bowl, the broadcasting network kicks off the bargaining process by announcing a target price for a 30-second spot. Yet, the actual price paid for a Super Bowl commercial may depend on multiple factors, including the relationship between a company and the network, additional advertising options which may be bought alongside a Super Bowl spot, and the overall demand for slots in that year.

The prices for an advertising slot during the game are extremely expensive. During our sample period, which spans from 2011 to 2018, the Super Bowl advertising rate per 30

[5] E.g., in the retail investment data of Kelley and Tetlock (2017) for the period 2003-2007, short sales comprise only 3.2% of the trade orders (and 5.5% of their dollar volume).

seconds increased from 3 million dollars to 5 million dollars (based on data from Forbes). As shown in Figure 1a, what the Super Bowl advertisers currently spend for 30 seconds of air time is more than what firms spend annually to advertise on TV for an average 30 minutes (according to data drawn from Kantar Media's Ad$ Summary). Advertisements on pre- and post-game shows are also more costly than the average Sunday TV advertisements. However, as Figure 1b illustrates (based on data extracted from Nielsen's Ad Intel), their total ad expenditures pale in comparison with the total ad expenditure during the game.

As can be seen in Table 1 (which summarizes reports extracted from AdAge) every year at least 90% of the ad inventory is sold one month prior to the game. Additionally, for half of the years in our sample (i.e., the years during the subperiod 2011-2014), 100% of the ad inventory is sold out at least 26 days in advance.[6] These two statistics are an important piece of our identification strategy, since they indicate that almost all the ad slots are distributed before the start of the NFL playoffs, when it is still uncertain which teams will appear in the Super Bowl.

For every year in the sample period, we hand collect data on the Super Bowl commercials from the USA Today Ad Meter and match them with the names of their companies in the Center for Research in Security Prices (CRSP). Since every commercial is described at the brand level, we are able to see how much overlap there is between the name of the advertised product and the name of its company. If a brand name is very different, we use the website of AdAge to watch its commercial and see if its company name or logo is displayed.

In our analysis, we focus on the stocks of the Super Bowl advertisers that could be recognized from their commercials.[7] As in Fehle, Tsyplakov, and Zdorovtsov (2005), a stock is considered to have recognizable advertising exposure in the Super Bowl if (i) a commercial

[6] A few advertisements are rejected or modified due to inconsistency with the network's or NFL's policies (e.g., they might refer to a religion, promote NFL banned drugs or supplements, or not be seen as age appropriate). In fact, some of these advertisements are intentionally prepared to be rejected and attract attention in the news. However, these incidents do not concern the publicly traded companies in our sample.

[7] For example, it is fairly difficult for someone to think of PepsiCo while watching a commercial of Doritos, a snacks brand owned by PepsiCo's subsidiary Frito-Lay. In contrast, Pepsi-Cola commercials can be easily associated with PepsiCo.

is about its company, or (ii) a commercial is about a product whose name overlaps with its company name, or (iii) a commercial displays its company logo. Stocks of firms with multiple Super Bowl commercials in a single year are considered to be recognizable if they can be recognized from at least one commercial. About 75% of the Super Bowl advertisers every year are recognizable. Later on, we will use the stocks of the non-recognizable Super Bowl advertisers for a placebo test in the robustness checks section.[8]

In Panel A of Table 2, we describe the distribution of the stocks with recognizable advertising exposure in the Super Bowl by year. The number of publicly traded firms that air Super Bowl commercials has almost doubled from 11 in 2011 to 19 in 2018. On average, there are about 14 Super Bowl advertisers every year.

To characterize their industrial profile, we use the Fama-French industry classification of stocks into 17 categories based on the four-digit Standard Industrial Classification (SIC) code, which is available from Kenneth R. French's website. Most of the companies are in the industry of services (Services), which has a growing trend (i.e., from roughly one third in 2011 to around two thirds in 2018). The second most popular industry is food (Food), with a stable number (i.e., 3 or 4) participants every year .

Yet, this industry representation hides the fact that, apart from some traditional Super Bowl advertisers (e.g., Anheuser-Busch), the actual firms in each industry change often. The large variation in the companies that advertise every year can be seen in online Appendix Table 1, which depicts the list of the Super Bowl advertisers by year. During the sample period, there is a total of 41 different Super Bowl advertisers.

2.2. Stock characteristics

The investment universe in this study consists of the stocks of Super Bowl advertisers and other members of the S&P500 Index during the sample period 2011-2018. Requiring a complete list of financial characteristics (described below) leads to a total number of 571

[8] We also omit from our analysis the less than a handful of foreign publicly traded companies that advertise in the Super Bowl (e.g., Honda, Toyota, and Wix).

different stocks.

Monthly data on stock prices and returns are drawn from CRSP, while firm accounting variables are obtained from Compustat at a quarterly frequency. The financial characteristics on which we focus are the market capitalization ($Size$), the book-to-market ratio (BTM), the turnover ratio (i.e., $Turnover$, defined as volume over number of shares outstanding), the momentum (i.e., $Momentum$, defined as the past annual return), the volatility (i.e., $Volatility$, defined as the standard deviation of monthly returns in the past year), the profitability (i.e., $Profitability$, defined as the ratio of past annual gross profits to assets) and the investment (i.e., $Investment$, defined as the past annual growth rate of assets).[9]

The summary statistics of the stock characteristics are presented in Panel B of Table 2. For reasons of comparison, the statistics are depicted separately for the Super Bowl advertisers and the other firms in our sample. The biggest difference between the two groups is in the market capitalization, as larger firms have more resources to spend on ads. The average size of the Super Bowl advertisers is 110.5 billion dollars (with a median of 96.3 billion dollars). On the other hand, the average size of the other S&P500 firms is 32.2 billion dollars (with a median of 14.7 billion dollars). On average, the Super Bowl advertisers have also about twice as high momentum (i.e., 0.27 versus 0.14), though the median is the same. All the other differences are small and statistically insignificant.

2.3. DMA viewership and demographics

To measure the exposure to the Super Bowl commercials, we collect the local Super Bowl viewership ratings ($Viewership$) in Nielsen's top 56 metered markets.[10] Importantly, we identify the DMAs where the teams that appear in the game are headquartered, and then construct a DMA-year-specific indicator variable ($Team$) that is equal to one if a local team from a given DMA plays in the Super Bowl in a given year. This is our instrument for the

[9] $Size$ and BTM are constructed as in Fama and French (1992).

[10] These are usually reported by the Sports Business Journal (and the local newspapers) on the post-Super Bowl Monday.

local viewership below.

We match the DMAs with their metropolitan statistical areas, using the delineation files from the U.S. Census Bureau, in order to extract their demographics. The population (Pop) and income per capita ($IncPerCap$) are drawn from the Bureau of Economic Analysis (BEA), while the unemployment rate ($Unemp$) is drawn from the Bureau of Labor Statistics (BLS). All the above variables — which are observed at an annual frequency — are summarized in Panel C of Table 2.

Both the average and median DMA viewership are equal to 50%, making the Super Bowl the most-watched television broadcast in the U.S. Nevertheless, the Super Bowl viewership varies across DMAs and years, with a standard deviation of about 4%. The teams that play in every Super Bowl are from 2 out of the 56 DMAs, and so the average of the local team appearance indicator variable is 0.036 ($\approx \frac{2}{56}$).[11]

2.4. Measuring the local investment attention

To construct our measure of local investment attention on a given stock, we download data from Google Trends following the methodology of Buchbinder (2019). We focus on searches for the name of each publicly traded company followed by the word "stock" (i.e., "Name of Company + Stock") on each post-Super Bowl Monday during the sample period. The data are rearranged to generate a relative interest, interpreted as the fraction (in percentage points) of searches for a given stock on a given day — out of the number of searches for any stock in the investment universe on that day. For example, an interest value of 5 in "Apple stock" in the New York DMA means that 5% of all local stock searches are for Apple.

We explain the procedure to obtain this interest variable in the online Appendix section: Construction of the local investment interest variable. To address the sampling error in the Google Trends data, we repeat the downloading process 30 times and then average our

[11] In online Appendix Table 2, we summarize the viewership during the sample period by each of the 56 DMAs. The table depicts clearly the variation in the viewership in a particular locality over time. The average standard deviation in the time-series of a DMA's viewership is 2.7. That statistic is the same even for DMAs that do not have a local team playing in the Super Bowl.

results. In addition to the post-Super Bowl Monday, we also extract data for the Monday four weeks before the Super Bowl (to control in our regressions for the general interest of a DMA's population in a given stock), the pre-Super Bowl Monday and Friday (for our pre-trends analysis), and the post-Super Bowl Tuesday and Friday (for our post-trends analysis).

The summary statistics of our measure (*Attention*) are shown in Panel C of Table 2. The distribution of the investment attention in a DMA is highly skewed to the right, with 90% of stocks having below average interest. We also calculate the average distance between a DMA and the headquarters of a stock (*Distance*), using their address ZIP-Code information.[12] The logarithm of this variable controls for the local bias in our regressions. In the same panel, we also summarize our advertising exposure variable (*Exposure*), as defined below.

3. Estimation

This section is split into seven subsections. We start by introducing our empirical framework. We then discuss a potential omitted variables concern, according to which firms decide to advertise in the Super Bowl based on the viewership in the local markets, and present evidence showing that this is unlikely to be relevant. Next, we address the reverse causality concern in the DMA viewership by proposing the Super Bowl appearance of a local team as an instrument. We then present our main results for the estimated impact of advertising exposure on investor attention. We also defend our exclusion restriction against two potential scenarios where it might fail. We also perform a pre- and post-trends analysis of our findings. Finally, we do a number of robustness checks to confirm the validity of our results.

3.1. Empirical framework

Our empirical specification consists of the following regression equation:

[12] Since Compustat contains only the most recent headquarter addresses of the stocks, we use the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) to obtain the historical headquarter addresses of the stocks in every year of the sample period.

$$Attention_{i,j,t} = \alpha + \beta \cdot Exposure_{i,j,t} + \boldsymbol{\gamma}' \boldsymbol{X}_{i,j,t} + \delta_{j,t} + \epsilon_{i,j,t}. \tag{1}$$

$Attention_{i,j,t}$ is the investment attention in DMA i to stock j on the post-Super Bowl Monday in year t. $Exposure_{i,j,t}$ is the exposure of households in DMA i to stock j's Super Bowl commercials in year t. $\boldsymbol{X}_{i,j,t}$ is a vector of controls described below, $\delta_{j,t}$ are stock-year fixed effects, and $\epsilon_{i,j,t}$ is a random disturbance.

Our measure for the advertising exposure is defined as follows:

$$Exposure_{i,j,t} = SuperBowlAd_{j,t} \times Viewership_{i,t} \tag{2}$$

where $SuperBowlAd_{j,t}$ is an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t, and $Viewership_{i,t}$ is the Super Bowl viewership in DMA i in year t. This measure is essentially the fraction of DMA i's population that watches stock j's advertisements during the Super Bowl. If stock j does not air a Super Bowl commercial in year t, then the measure is equal to zero. On the other hand, if stock j airs a Super Bowl commercial, then it is equal to DMA i's viewership in that year.

Our vector of controls, $\boldsymbol{X}_{i,j,t}$, includes the investment attention in DMA i on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,j,t}$), in order to capture the general interest in that DMA for that stock. Importantly, it also includes the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), which controls for the local bias in the investor attention. Moreover, it contains DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects.

Our stock-year fixed effects, $\delta_{j,t}$, capture all stock j's — observable and unobservable — characteristics in year t, such as stock j's nationwide advertising exposure in the Super Bowl ($SuperBowlAd_{j,t}$), financial characteristics, product launches, and national news coverage.

3.2. Examining the omitted variables concern in firm advertising

Even though our stock-year fixed effects account for a firm's decision to air a Super Bowl commercial in a given year, there is still a potential omitted variables concern according to which companies advertise in the Super Bowl to cater to their customer and investor bases that watch the game. For instance, a firm might decide to buy a Super Bowl ad if it expects a high Super Bowl viewership in the DMA where it is headquartered. However, as discussed in Section 2.1, almost all the Super Bowl ad inventory is sold out at least one month prior to the game, when the annual AFC and NFC champions have not yet been determined.

Nevertheless, to be conservative, we examine whether the Super Bowl viewership in the DMA where a stock is headquartered predicts its Super Bowl advertising. In this scenario, companies foresee the viewership in their local market and decide to air a commercial based on that. To test this possibility, we run a linear probability regression of stock j's Super Bowl advertising in year t ($SuperBowlAd_{j,t}$ defined exactly as above) on its local viewership ($Viewership_{j,t}$), financial characteristics (described in Section 2.2), stock fixed effects, and year fixed effects. This regression is shown in Column 1 of Table 3. The estimated coefficient of viewership is negligible and statistically insignificant.[13] Hence, this scenario seems unlikely.

Perhaps, what could be more relevant for a company's decision to advertise in the Super Bowl is the appearance of one of its local teams in the game. Although we cannot know the expectations that firms have for their local teams, we can approximate them using the implied probability from the betting odds. Taking into account the sold out dates of the Super Bowl ad inventory (in Column 3 of Table 1), we extract the AFC and NFC championship odds in late November from SportsOddsHistory.com. We then run a linear probability regression of stock j's Super Bowl advertising in year t on the implied probability that its local team will appear in the Super Bowl ($ImpProb_{j,t}$), and the same controls as above.[14] As shown in Column 2 of Table 3, the impact of this odds-based expectation is inconsequential and

[13] A one standard deviation increase in the local viewership would raise the probability that a stock airs a Super Bowl commercial by $0.017 \cdot 4.14\% \approx 0.07\%$, which is less than 3% relative to the average ($\frac{14}{571} \approx 2.45\%$).

[14] The implied probability is equal to $\frac{100}{100+odds}$ if the odds are positive, or $\frac{-odds}{100-odds}$ if the odds are negative.

statistically insignificant.

Lastly, it could be the case that the firms can make better predictions about the NFL than the sports betting market (or that the odds from the dates we extract are not relevant). We therefore assume to the extreme that the companies know the teams that will play in the game, and examine whether the actual Super Bowl appearance of a team in the DMA where stock j is headquartered ($Team_{j,t}$) predicts its Super Bowl advertising. This regression is depicted in Column 3 of Table 3. The estimated coefficient is almost zero and statistically insignificant, so we can reject this case as well.

We can thus assume for the rest of our analysis that the local market exposure is not a significant factor for a firm's decision to air a Super Bowl commercial. As indicated by the very expensive advertising rates (in Figure 1a), a company advertises in the Super Bowl primarily to increase its exposure at the national level, and not to cater to its local base. We briefly revisit this assumption later in the robustness section.

3.3. Addressing the reverse causality concern in DMA viewership

For us, a critical endogeneity issue is reverse causality. Since the Super Bowl is the biggest advertising event in the U.S., investors, analysts, and brokers are likely to tune in and watch the commercials of companies in whose stocks they are already interested. If these individuals have a sufficient mass, then the regions that search more for the stocks of the Super Bowl advertisers on the post-Super Bowl Monday may also have a higher viewership for the game.

We thus follow Stephens-Davidowitz, Varian, and Smith (2017), and use the Super Bowl appearance of a DMA's team ($Team_{i,t}$) as an instrument for its viewership ($Viewership_{i,t}$). Our instrument is valid if (i) it is relevant, in the sense that it strongly predicts the viewership in a given DMA, and (ii) it satisfies the exclusion restriction. Specifically, it should affect the local investors' attention to the stocks of the Super Bowl advertisers only through the viewership channel, as they are inclined to watch the game as fans of their local team.

To show that the relevance criterion is satisfied, we first compare the demographics between the high and low viewership regions. In particular, we split our DMA sample into two groups, based on whether their viewership is above or below the median in a given year, and then calculate the average demographics in each group. As shown in Panel A of Table 4, the DMAs with high viewership are similar to the DMAs with low viewership in terms of income per capita and unemployment rate. The average population number is about 1.3 million lower in the high viewership DMAs, but this difference is only marginally statistically significant (with a t-statistic of 2.22). Notably, 7% of the high viewership DMAs have a team in the Super Bowl, which means that, every year, the viewership in the two DMAs with a team in the game is above the median (i.e., $7\% \cdot \frac{56}{2} \approx 2$).

Expanding on this analysis, in Panel B of Table 4, we present the first-stage regression of the DMA viewership on the Super Bowl appearance of a local team. In Column 1, we do not include the instrument, and regress the DMA viewership only on DMA demographics, DMA fixed effects, and year fixed effects. The t-statistics of the estimated coefficients are low. In Column 2, where we include our instrument, the estimated R^2 increases from 66% to to 71%. The coefficient estimate of the instrument is highly statistically significant with a t-statistic of 6.34, and implies that a team's appearance in the Super Bowl increases the viewership in its DMA by around 11% ($\approx \frac{5.553\%}{49.66\%}$) relative to the average. In sum, the Super Bowl appearance of a local team is found to be the strongest predictor of a DMA's viewership.

3.4. Main results

In Table 5, we present the estimation results for our empirical specification, as defined by Eq. (1). In Column 1, we show the results from the OLS regression, where viewership is assumed to be exogenous. The estimated coefficient of the Super Bowl advertising exposure ($SuperBowlAd_{j,t} \times Viewership_{i,t}$) is 2.88 and has a t-statistic of 2.86. The implied economic effect of a one standard deviation increase in our exposure measure is an increase in the DMA investment interest by 78% ($\approx \frac{2.88 \cdot 0.073}{0.27}$) relative to the average interest for a stock in a DMA.[15] The estimated coefficients of the controls are as expected. The local investment interest for a stock four weeks ago has a small positive and marginally statistically significant coefficient, while distance has a negative and highly statistically significant coefficient.

In Column 2, we show the results from the 2SLS regression, where we use the Super Bowl appearance of a local team as an instrument for the viewership in a region. The estimated coefficient of the advertising exposure more than doubles relative to the OLS, becoming equal to 6.231 and statistically significant with a t-statistic of 3.13. In particular, the economic effect of a one standard deviation increase in the advertising exposure is an increase in the local investor attention by 168% $\left(\approx \frac{6.231 \cdot 0.073}{0.27}\right)$ relative to the average. This is equal to almost six times the economic effect of reducing the distance by half (calculated as $28\% \approx \frac{-0.111 \cdot \ln(\frac{1}{2})}{0.27}$).

Lastly, in Column 3, we present the results from the reduced-form IV regression, where $Viewership_{i,t}$ is replaced with the instrument $Team_{i,t}$. The interaction $SuperBowlAd_{j,t} \times Team_{i,t}$ is now a proxy for the exposure, and has an estimated coefficient of 0.38 with a t-statistic of 3.3. This means that the Super Bowl appearance of a local team increases the DMA investment attention to stocks that advertise by 140% relative to the average, which is consistent with the economic effect of the advertising exposure in the 2SLS regression above.

[15] As stated in Panel D of Table 2, the standard deviation of the advertising exposure variable is 0.073. It can also be derived, with some approximation error, from the following formula (that calculates the standard deviation of the product of two uncorrelated random variables):

$$\sigma_{SuperBowlAd \times Viewership} = \sqrt{(\sigma^2_{SuperBowlAd} + \mu^2_{SuperBowlAd}) \cdot (\sigma^2_{Viewership} + \mu^2_{Viewership}) - \mu^2_{SuperBowlAd} \cdot \mu^2_{Viewership}}$$

On average, 14 firms in the investment universe advertise in the Super Bowl every year, so $\hat{\mu}_{SuperBowlAd} = \frac{14}{571} \approx 2.45\%$ and $\hat{\sigma}_{SuperBowlAd} = \sqrt{\frac{14}{571}(1 - \frac{14}{571})} \approx 15.47\%$. Moreover, according to Panel C of Table 2, $\hat{\mu}_{Viewership} = 49.66\%$ and $\hat{\sigma}_{Viewership} = 4.14\%$. Plugging these numbers in the above equation yields 0.077, which is pretty close to 0.073.

3.5. Further analysis of the exclusion restriction

3.5.1. Risk preferences or expectations if a local team plays in the Super Bowl

One potential concern regarding our exclusion restriction is that a team's appearance in the Super Bowl might change the risk preferences or expectations of its fans. For example, the households in the DMAs where the Super Bowl teams are based might become overoptimistic, and perhaps more interested in investing in stocks — and in the stocks of the Super Bowl advertisers in particular. In this case, our instrument ought not be excluded.

However, under that setup, one would also expect a difference in the risk preferences or expectations between the households in the DMA of the team that wins the Super Bowl and the households in the DMA of the team that loses the Super Bowl. But that, in turn, would imply a difference between the households' stock searches in the two DMAs based on whose team wins the game, which is an implication which we can test with our data.

To examine this possibility we focus every year only on the DMAs whose teams appear in the Super Bowl (i.e., the DMAs for which $Team_{i,t} = 1$) and run a regression of investment interest on $SuperBowlAd_{j,t} \times Winner_{i,t}$, where $Winner_{i,t}$ is an indicator variable that is equal to one if a team in DMA i wins the Super Bowl in year t. The results from this subsample regression are presented in Table 6. The estimated coefficient is not statistically significant at any reasonable level of significance. Thus, winning the Super Bowl has a mute impact on the household's stock searches. But this also suggests that the Super Bowl appearance of a local team (which results from winning the AFC or NFC championship) should not change the local investment interest through any channel other than viewership.

3.5.2. Removing DMAs with a high fraction of finance industry employees or high level of Social Capital Index

Another exclusion restriction concern relates to a model in which households are exposed to the advertisements of stocks not only through viewership but also through intermediaries.

For example, local analysts or brokers might pitch the stocks of the Super Bowl advertisers as investment ideas to their clients on the Monday after the game. More broadly, local peers may share their views or media coverage about the companies that advertise with each other. If the Super Bowl appearance of a local team enhances the role of the local intermediaries, then our exclusion restriction might fail.

We thus repeat our estimation in subsamples where we drop either the DMAs with a high fraction of finance industry employees or the DMAs with a high level of social interactions. In these DMA subsamples, intermediaries or peer groups should respectively be less of a concern.[16] The estimation results are presented in Table 7.

In Panel A, we focus on the subsample of DMAs where the fraction of finance industry employees is low. We first calculate the fraction of finance industry employees in every DMA and year, using the metropolitan area-level data on the "Industry by Occupation for Employed Civilian Population 16 Years and Over" from the American Community Survey 1-Year Estimates. In every year, we then keep only the DMAs where that fraction is below the current median.

In Column 1, the OLS estimated coefficient is roughly the same as in the whole sample, but less statistically significant. In Column 2, the 2SLS estimated coefficient is about 2.7 times higher than before, and statistically significant with a t-statistic of 2.87. In the same spirit, the IV-reduced form coefficient is about 4.2 times higher, and statistically significant with a t-statistic of 2.84.

In Panel B, we consider only DMAs where the level of social interactions is low. To measure the sociability level in a DMA, we calculate the population-weighted average of the

[16] Intermediaries might impact the estimation of the advertising effect through viewership in two ways. First, intermediaries might reach out to households that have not watched the Super Bowl, and inform them about the firms that advertised during the game. In this case, their presence might increase the stock searches in the low viewership DMAs, and thus underestimate the advertising effect through higher viewership that we identify. Second, intermediaries might also reach out to households who have watched the Super Bowl, and remind them of the Super Bowl advertisers. In that case, their presence might increase the stock searches in the high viewership DMAs, and hence overestimate the effect of viewership. The sharper estimate of the advertising effect that we obtain in the subsamples where the role of intermediaries and peer groups is more limited suggests that their presence is more relevant for the stock searches in the low viewership DMAs.

Social Capital Index in its counties.[17] The index is provided by the Social Capital Project of the United States Joint Economic Committee, and is constructed after taking into account surveys that were conducted during the period 2006-2016. We can then run our regressions in the subsample of DMAs where the Social Capital Index is below the median.

In Column 1, the OLS estimated coefficient is 60% smaller and statistically insignificant. However, in Column 2, the 2SLS estimated coefficient is about twice as high as in the whole sample, and statistically significant with a t-statistic 2.19. The higher causal estimate of the advertising exposure is consistent with the result above. Similarly, in Column 3, the IV-reduced form estimated coefficient also approximately doubles, and is statistically significant with a t-statistic of 2.2.

3.6. Pre- and post-trends analysis

3.6.1. Testing for pre-trends

We also investigate whether the identified effect of the advertising exposure on the local investment interest is driven by pre-trends. The argument behind this conjecture is that households, especially in the DMAs with high Super Bowl viewership, could encounter in their readings references about the Super Bowl commercials during the pre-Super Bowl week, and hence start searching for the stocks of the Super Bowl advertisers even before the game. Although this scenario is possible, any pre-Super Bowl exposure to the advertising firms is far weaker than the exposure that takes place during the game.

But to be sure, we rerun the regression in Eq. (1) using as new dependent variables the local investment attention based on the households' stock searches on the pre-Super Friday ($AttentionFriBef_{i,j,t}$) and the pre-Super Bowl Monday ($AttentionMonBef_{i,j,t}$).[18] If we are right, then these placebo regressions should show that the advertising exposure during the

[17] The Social Capital Index is a proxy for the level of sociability developed originally by Putnam (2000). See also Ivković and Weisbenner (2007).

[18] These two days are picked without loss of generality. The results are similar for the other days of the pre-Super Bowl week, as illustrated in online Appendix Figure 1.

Super Bowl (as captured by the interaction $SuperBowlAd_{j,t} \times Viewership_{i,t}$) has, if any, little impact on the local investment interest before the game.

Our results are depicted in Table 8. In Panel A, where the dependent variable is the DMA investment attention on the pre-Super Bowl Friday, all the estimated coefficients (i.e., the OLS, the 2SLS, and the IV-reduced form) are small, negative and statistically insignificant at any conventional level of statistical significance. Moreover, in Panel B, where the dependent variable is the DMA investment attention on the pre-Super Bowl Monday, all the estimated coefficients are only slightly above zero, and statistically insignificant with small t-statistics.

In online Appendix Table 3, we also consider a triple difference regression of DMA investment attention, where the first difference is with respect to whether a firm airs a Super Bowl commercial, the second difference is with respect to the viewership across local markets, and the third difference is with respect to whether the stock searches (based on which our local investment interest is measured) take place before or after the game (e.g., pre-Super Bowl Friday versus post-Super Monday). All the results that we obtain are consistent with the results in Tables 5 and 8.

3.6.2. Testing for post-trends

There is also the question of whether the effect of the advertising exposure on the investment attention can last over time. To see if there are any post-trends, we repeat the estimation of Eq. (1) using as new dependent variables the local investment interest on the post-Super Tuesday ($AttentionTueAft_{i,j,t}$) and the post-Super Bowl Friday ($AttentionFriAft_{i,j,t}$). Our estimation results are presented in online Appendix Table 4. In either case, the estimated coefficient coefficients of the exposure have a small (negative or positive) magnitude and are not statistically significant.

For a clear visualization of the results in our pre- and post-trends analysis, we depict, in Figure 2, the 2SLS (in Subfigure 2a) and the IV-reduced form (in Subfigure 2b) coefficient point estimates (shown with a white dash) and their corresponding 95% confidence intervals (shown with solid black lines) on each of the aforementioned days. In a nutshell, the effect of the advertising exposure on the DMA investment attention does not show up before the Super Bowl, and does not last for more than one day.

3.7. Robustness checks

3.7.1. Revisiting the omitted variables concern in firm advertising

One of the concerns discussed above is that firms might choose to advertise to cater to their local bases that watch the game, based on their expectations about the local viewership. Indeed, in Subsection 3.2, we present evidence according to which this possibility should not be a major issue.

Another alternative for us is to consider only the years in our sample period when 100% of the ad inventory is sold out about one month (or 26 days to be exact) in advance. As shown in Table 1, these are the years 2011-2014. Since the NFL playoffs start around that time, all the advertising slots are booked when there are about twelve teams still competing for a place in the Super Bowl. In online Appendix Table 5, we show that the estimated coefficients of the advertising exposure in this subsample of years are also positive, statistically significant, and, if anything larger than the ones in the full sample.

We can also explicitly look for the firms that air Super Bowl commercials only in the years when a team in the DMA where they are headquartered appears in the Super Bowl, and drop them from our sample. This is the case for only two of the Super Bowl advertisers in our sample, namely Metlife and Microsoft.[19] The results from this regression are presented in online Appendix Table 6. The OLS coefficient estimate is the about the same, while the 2SLS and IV-reduced form estimated coefficients are around 23% lower, entailing therefore a similar advertising effect.

[19] According to online Appendix Table 1, Metlife, which is based in New York City, aired a Super Bowl commercial in 2012, when the New York Giants played in the Super Bowl. On the other hand, Microsoft, which is based in the metro area of Seattle, advertised in the Super Bowl in 2014 and 2015, when the Seattle Seahawks played in the game.

3.7.2. Dropping DMAs without an NFL team

Another potential worry is that our results might be driven by the absence of an NFL team in some of Nielsen's top 56 local markets. On average, 30 out of the 56 DMAs in our sample have an NFL team every year. The viewership in the DMAs without an NFL team could be lower because households in these areas might have a lower taste for football, which could overestimate the effect of advertising exposure.

However, that is not the case. The average difference in the Super Bowl viewership between (i) the DMAs that have an NFL team but not a team in the Super Bowl and (ii) the DMAs that do not have any NFL team is less than 1% and statistically insignificant. We also repeat the estimation focusing exclusively on the DMAs with an NFL team in online Appendix Table 7. The OLS coefficient estimate becomes insignificant, but the estimated values of the 2SLS and IV-reduced form coefficients are very close to our prior estimates.[20]

3.7.3. Placebo regressions based on firm recognizability

The effect of the advertising exposure on households' investment attention that we estimate relies on the firms being recognizable from their Super Bowl commercials. As described in Section 2.1, when we construct the indicator variable for a firm's Super Bowl advertising in a given year ($SuperBowlAd_{j,t}$), we make sure that the viewer is in a position to recognize the advertising firm from the advertising content. Yet, in every year, there are also Super Bowl advertisers that do not have a recognizable advertising exposure. In particular, 25% of the publicly traded firms that air Super Bowl ads every year cannot be recognized (according to the three criteria provided by Fehle, Tsyplakov, and Zdorovtsov (2005)). Their distribution into the 17 Fama-French industries by year is depicted in online Appendix Table 8.

[20] We also attempted to estimate the advertising effect exclusively in the DMAs without an NFL team. Since our instrument is always zero in this subsample, we used Twitter's 2014 NFL fan map (available at https://interactive.twitter.com/nfl_followers2014/) to generate variation in the DMAs' viewership based on the percent of users that follow the NFL teams that appear in the Super Bowl in a given year. However, our first-stage was weak and as a result, we could not obtain statistically significant effects of the advertising exposure.

Even though these companies are only a few, we can still examine how our estimates for the advertising effect change, as we waive the recognizability requirement. Specifically, we hypothesize that dropping this requirement lowers the estimated effect of exposure. In Panel A of online Appendix 9, we reestimate our empirical specification after replacing $SuperBowlAd_{j,t}$ with $SuperBowlAdRnR_{j,t}$, i.e., an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t, independently of whether it can be recognized from it. All the estimated coefficients that we obtain decrease slightly, but more importantly become noisy, with lower t-statistics that make them only marginally statistically significant.

In Panel B of the same table, we also keep the interaction $SuperBowlAd_{j,t} \times Viewership_{i,t}$ intact (i.e., our original exposure measure which assumes recognizability) and add another exposure measure for the stocks that cannot be recognized from their commercials (i.e., $SuperBowlAdUnrec_{j,t} \times Viewership_{i,t}$), based on the indicator variable $SuperBowlAdUnrec_{j,t}$ which equals one if stock j airs a Super Bowl commercial in year t from which it cannot be recognized. That setup allows us to directly test whether the difference between recognizable and unrecognizable advertising exposure is statistically significant.

Indeed, all the estimated coefficients of the recognizable advertising exposure are virtually the same as before, while all the estimated coefficients of the non-recognizable advertising exposure have a small and statistically insignificant magnitude. In other words, being able to recognize a firm from its advertisements is necessary for attracting household's investment attention.

3.7.4. Other advertising characteristics

For robustness, we also experiment with alternative definitions of the advertisement exposure, based on the characteristics of the commercials. Specifically, we redefine exposure based on the length or the likeability rating in the USA Today Super Bowl Ad Meter. For companies that air more than one commercials in a single Super Bowl game, we produce these measures by adding their lengths and averaging their likeability ratings. We present the results of these regressions in online Appendix Table 10.

In Panel A, the 2SLS estimated coefficient of the exposure based on length, defined as $AdLength_{j,t} \times Viewership_{i,t}$ is 0.061 and statistically significant with a t-statistic of 3.13. The implied economic effect of a one standard deviation increase in this measure is an increase in the local investment interest by around 155% ($\approx \frac{0.061 \cdot 6.848}{0.27}$) relative to the average. It suggests that the longer the exposure to a company's commercial, the higher the investment attention to that company's stock.

Moreover, in Panel B, we define exposure based on the likeability, using the interaction $AdRating_{j,t} \times Viewership_{i,t}$. The 2SLS estimated coefficient is 1.156, with a t-statistic of 2.94. The economic effect of a one standard deviation increase in exposure is an increase by about 193% ($\approx \frac{1.156 \cdot 0.451}{0.27}$) relative to the average local interest for a stock. It suggests that better commercials bring more investment attention. Thus, the estimated effects of the advertising exposure based on these alternative measures are consistent with the effect that we estimate in our main specification.

4. The impact of advertising for local and distant stocks

Having identified the effect of the Super Bowl advertising exposure on household's investment attention, we next investigate how it interacts with the local bias in their stock searches. After all, our previous regressions also show that geographical proximity (captured by the negative coefficient of $LogDistance_{i,j}$) is a significant factor of the local investment interest. Therefore, is interesting to see the extent to which the advertisements of distant firms can make the investment attention in a DMA less local.

In particular, for every DMA, we distinguish stocks with respect to:

1. Being local or non-local based on whether the average distance of a DMA from a stock's headquarters (according to address ZIP-Codes) is less than or equal to a certain distance threshold. As in Ivković and Weisbenner (2005) and Seasholes and Zhu (2010),

the distance threshold is set to either 100 or 250 miles.

2. Having high or low Super Bowl advertising exposure, based on whether a stock airs a Super Bowl commercial in a given year, and whether the Super Bowl viewership in a DMA is high (i.e., above the median) in that year. Of course, if a company does not advertise in the Super Bowl, then its advertising exposure is zero, and therefore low.

Based on the two above criteria, stocks are classified as: (i) distant with high advertisement exposure, (ii) local with high advertisement exposure, (iii) local with low advertisement exposure, and (iv) distant with low advertisement exposure. We choose the last category to be the base group in the following regression framework:

$$\begin{aligned} Attention_{i,j,t} = \alpha &+ \beta_1 \cdot Away_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t}) \\ &+ \beta_2 \cdot Local_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t}) \\ &+ \beta_3 \cdot Local_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t}) \\ &+ Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \tag{3}$$

where $Away_{i,j,t} = \mathbf{1}[Distance_{i,j,t} > D]$, $Local_{i,j,t} = \mathbf{1}[Distance_{i,j,t} \leq D]$, D is the distance threshold, and $HighView_{i,t}$ is an indicator variable that is equal to one if DMA i's Super Bowl viewership is above the median in year t.

We present the estimation results of this this regressions in Table 9. In Panel A, a stock's locality is characterized according to the distance threshold of 100 miles (i.e., $D = 100$), while Panel B corresponds to the distance threshold of 250 miles (i.e., $D = 250$). We discuss below three findings that are robust across the three columns that depict the OLS, the 2SLS, and the IV-reduced form.

Finding 1. *Advertising exposure has a positive effect on households' investment attention to both local and non-local stocks.*

First, independently of whether a stock is local or non-local, its high advertising exposure has a positive effect on investment attention, which is consistent with the results in the previous section. Analytically, for non-local stocks, the estimated coefficient of $Away_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$ is positive and statistically significant in both panels. Since the base group in the regressions are non-local stocks with low advertising exposure (i.e., $Away_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$), this means that non-local stocks with high exposure capture more of the investors' attention (than non-local stocks with low exposure).

Focusing on the 2SLS estimation results, in Panel A, high advertising exposure increases the attention to stocks headquartered more than 100 miles away by 1.081 percentage points (with a t-statistic of 3.36). Similarly, in Panel B, the increase in the interest for stocks headquartered more than 250 miles away is 1.313 points (with the t-statistic of 2.97).

Moreover, high exposure increases also the attention to local stocks, since the 2SLS coefficient of $Local_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$ is estimated to be higher than the coefficient of $Local_{i,j,t} \times (1 - Ad_{j,t} \times HighView_{i,t})$. Specifically, in both panels, the former is around four times higher than latter (i.e., $4.2 \approx \frac{1.771}{0.42}$ in Panel A, and $3.5 \approx \frac{0.662}{0.187}$ in Panel B). The marginal statistical significance of the estimated coefficient of $Local_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$ (with a t-statistic of 1.86 in Panel A and 2.22 in Panel B) is probably an issue of power, since few stock-DMA pairs are classified as local.

Finding 2. *Advertising exposure has a stronger effect on household's investment attention than geographical proximity.*

Secondly, and importantly, the investment interest for non-local stocks that experience a high advertising exposure in a DMA is higher than the investment interest for local stocks that do not. Depending on the distance threshold based on which a stock is defined as local, the 2SLS of the estimated coefficient of $Away_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$ is roughly almost three (i.e., $2.6 \approx \frac{1.081}{0.42}$ for 100 miles in Panel A) to seven times (i.e., $7 \approx \frac{1.313}{0.187}$ for 250 miles in Panel B) higher than the the estimated coefficient of $Local_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$. So, indeed, Super Bowl advertising substitutes the local bias, making households' investment attention extend beyond their region.

Finding 3. *Geographical proximity amplifies the effect of advertising exposure only for relatively short distances.*

Finally, the investment interest in a DMA for stocks that have high advertising exposure could be higher or lower if they are also local. It all depends on the distance threshold based on which a firm's locality is defined. In Panel A, where stocks are considered local if their headquarters are less than 100 miles away, the 2SLS estimated coefficient of local stocks with high exposure ($Local_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$) is about 63% higher (i.e., 1.771 versus 1.081) than the 2SLS estimated coefficient of non-local stocks with high exposure ($Away_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$). On the other hand, in Panel B, where the distance threshold for local stocks is 250 miles, the estimated coefficient of non-local stocks with high exposure is around 98% higher (i.e., 1.313 versus 0.662) than the 2SLS estimated coefficient of local stocks with high exposure.

This seemingly conflicting result, according to which, in Panel A, stocks headquartered less than 100 miles seem to benefit the most, while, in Panel B, stocks with headquarters more than 250 miles away get most of the attention, can be addressed by considering a finer distinction of a stock's proximity that nests both previous distance thresholds into a single regression framework, as follows:

$$\begin{aligned}
Attention_{i,j,t} = \alpha &+ \beta_1 \cdot Away^{250}_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t}) \\
&+ \beta_2 \cdot Betw^{100,250}_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t}) \\
&+ \beta_3 \cdot Betw^{100,250}_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t}) \\
&+ \beta_4 \cdot Local^{100}_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t}) \\
&+ \beta_5 \cdot Local^{100}_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t}) \\
&+ Controls_{i,j,t} + \epsilon_{i,j,t} \qquad (4)
\end{aligned}$$

where $Away^{250}_{i,j,t} = \mathbf{1}[Distance_{i,j,t} > 250]$, $Betw^{100,250}_{i,j,t} = \mathbf{1}[100 < Distance_{i,j,t} \leq 250]$, and

$Local^{100}_{i,j,t} = \mathbf{1}[Distance_{i,j,t} \leq 100]$.[21]

For illustration purposes, we depict the IV coefficient estimates of this regression, together with their 95% confidence intervals, in Figure 3. The full estimation results are presented in online Appendix Table 11. Both the 2SLS (in Subfigure 3a) and the IV-reduced form coefficients in (in Subfigure 3b) show a non-linear distance variation of the high advertising exposure effect on investment attention.[22] In particular, the highest estimated coefficient in the 2SLS is the one of $Local^{100}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$. Though it is marginally statistically significant, it indicates that, given a high advertising exposure, the nearest local stocks attract most of the investment attention. The second highest 2SLS estimated coefficient is the one of $Away^{250}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$. This coefficient estimate has lower variance and indicates that, the second-highest increase in the investment interest from high exposure is for distant stocks. As for the 2SLS estimated coefficient of the stocks with high exposure that are in between ($Betw^{100,250}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$), i.e., the not too local but also not too distant stocks, it is found to be much smaller and statistically insignificant.[23]

[21] In the spirit of Grinblatt and Keloharju (2001), we also experiment in online Appendix Table 12 with the alternative distance thresholds of 100 and 450 kilometers (which are respectively equivalent to around 62 and 280 miles). The results that we obtain are similar to the ones above.

[22] Although there is some overlap of the confidence intervals, the differences are statistically significant. Specifically, in Subfigure 3a, the difference between the coefficient of $Local^{100}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$ and the coefficient of $Betw^{100,250}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$ is marginally significant at a level close to 10%, while the difference between the coefficient of $Away^{250}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$ and the coefficient of $Betw^{100,250}_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$ is significant at the 5% level. The joint hypothesis that the aforementioned coefficients are all equal is rejected at the 1% level. Similarly, in Subfigure 3b, the difference between the coefficient of $Local^{100}_{i,j,t} \times (Ad_{j,t} \times Team_{i,t})$ and the coefficient of $Betw^{100,250}_{i,j,t} \times (Ad_{j,t} \times Team_{i,t})$ is significant at the 5% level, while the difference between the coefficient of $Away^{250}_{i,j,t} \times (Ad_{j,t} \times Team_{i,t})$ and the coefficient of $Betw^{100,250}_{i,j,t} \times (Ad_{j,t} \times Team_{i,t})$ is significant at the 1% level. The joint hypothesis that sets these coefficients equal is also rejected at the 0.1% level.

[23] We further examine whether there are any industries in which firms are more (or less) likely to be local to the DMAs in our sample. In online Appendix Table 13, we present the linear probability regressions of stock j's industry indicators on the average values of indicators of its geographical proximity (i.e., $\overline{Local100mi}_{j,t} \equiv \frac{1}{56}\sum_{i=1}^{56} Local100mi_{i,j,t}$ and $\overline{Betw100\_250mi}_{j,t} \equiv \frac{1}{56}\sum_{i=1}^{56} Betw100\_250mi_{i,j,t}$) . We then drop the industries where the coefficients of these variables are found to be statistically significant (i.e., Mines, Oil, Drugs etc., Construction, Machines and Transportation), and repeat the estimation of Eq. (4). As shown in online Appendix 14, the results are similar.

5. Conclusion

Product commercials can increase households' interest for the stocks of the advertising firms. There is a growing literature on estimating the impact of advertising on investment attention based on data that could approximate investors' consideration sets. An important issue in the identification of that impact is that a firm's marketing activities are expected to be correlated with many of its characteristics. Our paper solves this omitted variables concern by estimating the advertising effect within the same firm-advertising event, using the geographic variation in the viewership of the Super Bowl (i.e., America's largest advertising event) and a measure of the local investment interest developed by Buchbinder (2019).

At the same time, we also address the issue of reverse causality, according to which investors, analysts and brokers tune in to watch the Super Bowl commercials of firms in whose stocks they are already interested. Our instrument for the viewership in a local market is the Super Bowl appearance of a local team. The advertising effect that we identify is sizeable and much stronger than the local bias.

In fact, we also study how advertising interacts with a firm's geographical proximity. We show that high advertising exposure increases the investment interest for both local and non-local stocks. But more notably, the interest for non-local stocks with high advertising exposure becomes higher than the interest for local stocks with low exposure. Hence, Super Bowl commercials can make households' investment attention less local. Moreover, we show that geographical proximity amplifies the effect of exposure only for the nearest local firms.

Our work could be extended in future household finance studies on advertising. First, the appearance of a sports team in a highly watched event, such as the college football bowl games in Mayer (2019), is likely to be a good instrument for the advertising exposure in the team's local market. Hence, one could use our regression framework and local interest measure to obtain more estimates of the effects of commercials on investor attention.

Second, to fully assess the importance of advertising for households' investment decisions, it is important to quantify how much of the increase in the investment attention that it generates ends up affecting the actual stock portfolios. As stated in the introduction, this depends on households' information and transaction costs, and their post-search expectations about the performance of the advertising companies. Therefore, future studies on advertising that could combine data on households' stock searches with data on their stockholdings, following the style of Gargano and Rossi (2018), are very promising.[24]

Lastly, in regard to the field of financial planning, our findings about the effect of the Super Bowl commercials on investor attention could be useful for financial advisors interested in nudging their clients towards saving more, since it might be easier for them to suggest an investment in a stock which the client is already considering. In other words, knowing the commercials to which clients are exposed is soft information that could be a valuable item in an advisor's toolkit (e.g., Davies (2020)).

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Table 1

AdAge reports about the sales of Super Bowl ads

This table presents information about the Super Bowl ad sales based on reports from AdAge. Column 1 refers to the football season. Column 2 refers to the date of the Super Bowl. Column 3 refers to the date of the report. Column 4 shows the numbers of days between the two dates. Column 5 shows the ad inventory that has been sold by the date of the report.

(1) Season	(2) Super Bowl date	(3) Report date	(4) Days in between	(5) Ad inventory sold
2010	2/6/2011	10/29/2010	100	100%[1]
2011	2/5/2012	1/3/2012	33	100%[2]
2012	2/3/2013	1/8/2013	26	100%[3]
2013	2/2/2014	12/4/2013	60	100%[4]
2014	2/1/2015	11/10/2014	83	90%[5]
2015	2/7/2016	11/3/2015	96	"nearly" 100%[6]
2016	2/5/2017	12/8/2016	59	90%[7]
2017	2/4/2018	1/11/2018	24	"all but 10 spots"[8]

URLs:

1. https://adage.com/article/special-report-super-bowl/advertising-super-bowl-ads-sold/146788
2. https://adage.com/article/special-report-super-bowl/nbc-sold-super-bowl-tv-inventory/231848
3. https://adage.com/article/special-report-super-bowl/cbs-sells-super-bowl-inventory/239064
4. https://adage.com/article/special-report-super-bowl/fox-sells-super-bowl-inventory/245517
5. https://adage.com/article/special-report-super-bowl/super-bowl-immune-tv-ad-woes/295802
6. https://adage.com/article/media/cbs-sold-out-super-bowl-50-spots/301208
7. https://adage.com/article/special-report-super-bowl/super-bowl-li-ad-time-fox-sells-90-commercial-time/307080
8. https://adage.com/article/special-report-super-bowl/super-bowl-newsletter/311916

Table 2
Summary statistics

This table summarizes the variables in our sample. Panel A shows the distribution of stocks with recognizable advertising exposure in the Super Bowl by year. Row 1 shows their total number. Rows 2-18 show the industries of the stocks based on the 17 Fama-French industry portfolios. Panel B shows the financial characteristics of the stocks that air Super Bowl commercials and other stocks in the S&P500 Index. *Size* is the market capitalization. *BTM* is the book-to-market ratio. *Turnover* is the monthly share turnover. *Momentum* is the past 12-month return. *Volatility* is the volatility of the monthly returns in the past 12 months. *Profitability* is the ratio of past annual gross profits to assets. *Investment* is the past annual growth rate of assets. Panel C shows the DMA Super Bowl viewership and demographics. *Viewership* is the Super Bowl viewership. *Team* is an indicator variable that equals one if a local team appears in the Super Bowl. *Pop* is the population number. *IncPerCap* is the income per capita. *Unemp* is the unemployment rate. Panel D shows the DMA investor attention, distance from the headquarters of a stock, and advertising exposure. *Attention* is the fraction (in percentage points) of Google searches for a given stock — out of the number of searches for any stock in the universe — on a given post-Super Bowl Monday. *Distance* is the average distance between the ZIP-Codes of a DMA and the ZIP-Code of the headquarters of a stock. *Exposure* is the advertising exposure of a DMA to a given stock, defined as $SuperBowlAd \times Viewership$, i.e., the interaction between an indicator variable that equals one if the respective stock airs a Super Bowl commercial and the DMA's Super Bowl viewership. The sample consists of 56 DMAs during the years 2011-2018. The sources of our data are outlined in Section 2 of our paper.

Panel A: Distribution of stocks with recognizable ad exposure in the Super Bowl by year

	Year							
	2011	2012	2013	2014	2015	2016	2017	2018
Total Number	11	11	9	13	15	15	19	19
Industry								
Food	3	3	3	4	3	3	3	4
Mines								
Oil								
Clothes	1	1	1		1			1
Consumer durables								
Chemicals								
Drugs, soap, perfumes & tobacco						1		
Construction								
Steel								
Fabricated products								
Machines		1					1	
Cars	1			2	1		2	
Transportation								
Utilities								
Retail stores	2	1	1	1	1		1	1
Finance	1	2	1	1	1	1	1	1
Services	3	3	3	5	8	10	11	12

Table 2 Cont'd: Summary statistics

Panel B: Stock financial characteristics

		Mean	S.D.	Median	Min	Max
Size (million $)	SB advertisers	110,460	115,226	96,258	2,337	702,386
	Other	32,239	57,623	14,723	1,467	849,542
BTM	SB advertisers	0.39	0.38	0.26	0	1.92
	Other	0.42	0.37	0.33	-0.9	4.62
Turnover	SB advertisers	0.17	0.12	0.14	0.06	0.65
	Other	0.22	0.18	0.17	0.01	4.85
Momentum	SB advertisers	0.27	1.23	0.12	-0.51	9.89
	Other	0.14	0.35	0.12	-0.82	6.34
Volatility	SB advertisers	0.07	0.03	0.06	0.02	0.15
	Other	0.07	0.03	0.06	0.02	0.34
Profitability	SB advertisers	0.33	0.2	0.31	0	0.85
	Other	0.28	0.21	0.25	-1.14	1.27
Investment	SB advertisers	0.07	0.16	0.04	-0.37	0.71
	Other	0.1	0.32	0.05	-0.73	6.49

Panel C: DMA Super Bowl viewership and demographics

	Mean	S.D.	Median	Min	Max
Viewership (%)	49.66	4.14	49.9	37.5	61
Team	0.036	0.19	0	0	1
Pop (million)	3.1	3.25	2.08	0.43	20.02
IncPerCap (thousand $)	45.83	7.88	44.39	31.57	86.43
Unemp (%)	6.58	2.2	6.18	2.62	13.86

Panel D: DMA investment attention, distance from stock headquarters, and advertising exposure

	Mean	S.D.	Median	Min	Max
Attention (%)	0.27	1.95	0	0	98
Distance (miles)	1,077	701	926	11	2,731
Exposure	.011	.073	0	0	0.61

Table 3

Linear probability regressions of the Super Bowl advertising of stocks on the local Super Bowl viewership, or the odds-based expected or actual appearance of a local team

This table presents the linear probability regressions of the Super Bowl advertising of stocks on the local Super Bowl viewership, or the odds-based expected or actual Super Bowl appearance of a local team. The dependent variable is $SuperBowlAd_{j,t}$, i.e., an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t. In Column 1, the independent variable is $Viewership_{j,t}$, i.e., the Super Bowl viewership in the DMA where stock j is headquartered in year t. In Column 2, the independent variable is $ImpProb_{j,t}$, i.e., the implied probability (based on the odds at the end of November) that a team in the DMA where stock j is headquartered will appear in the Super Bowl in year t. In Column 3, the independent variable is $Team_{j,t}$, i.e., the an indicator variable that is equal to one if a team in the DMA where stock j is headquartered appears in the Super Bowl in year t. The list of controls includes financial characteristics, stock fixed effects, and year fixed effects. The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1)	(2)	(3)
Viewership	0.017		
	[0.34]		
ImpProb		-0.002	
		[-0.06]	
Team			0.007
			[0.88]
Financial char's	YES	YES	YES
Stock FE	YES	YES	YES
Year FE	YES	YES	YES
Number of years	8	8	8
Number of stocks	571	571	571
R^2	0.64	0.64	0.64

Table 4

Predicting the DMA viewership based on the Super Bowl appearance of a local team

This table presents the demographic comparison of the high versus low viewership DMAs and the first-stage regression of the DMA viewership on the Super Bowl appearance of a local team. Panel A presents the balance tests of DMA demographics based on the Super Bowl viewership. The DMA sample is split into two groups based on the median local Super Bowl viewership in a given year. In each subsample, the averages of the DMA demographics are calculated. Column 1 (Column 2) refers to the subsample in which the Super Bowl viewership is below (above) the median. Column 3 depicts the differences between the average DMA demographics in the two groups. Column 4 depicts the t-statistics of paired difference tests (after regressing the DMA demographics on $HighView_{i,t}$, i.e., an indicator variable that equals one if DMA i's Super Bowl viewership is above the median in year t, and double clustering standard errors at the DMA and year level). Panel B shows the first-stage regression of the DMA viewership on the Super Bowl appearance of a local team. The dependent variable is $Viewership_{i,t}$, i.e., DMA i's Super Bowl viewership in year t. The independent variable is $Team_{i,t}$, i.e., an indicator variable that equals one if a team from DMA i appears in the Super Bowl in year t. The independent variable is absent in Column 1 and included in Column 2. In both columns, DMA demographics, DMA fixed effects, and year fixed effects are included as controls. The table depicts the coefficient estimates and t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

Panel A: Balance tests of DMA demographics based on the Super Bowl viewership

	(1)	(2)	(3)	(4)
Averages	Below median	Above median	Difference	t-statistic
Pop (million)	3.76	2.42	-1.34	-2.22
IncPerCap (thousand $)	46.62	45.03	-1.59	-1.23
Unemp (%)	6.62	6.54	-0.08	-0.44
Team	0	0.07	0.07	3.34

Panel B: First-stage regression of the DMA Super Bowl viewership

	(1)	(2)
Team		5.553
		[6.34]
LogPop	-11.833	-14.648
	[-1.69]	[-2.48]
LogUnemp	0.937	1.438
	[0.57]	[0.86]
LogIncPerCap	3.698	4.299
	[0.59]	[0.71]
DMA FE	YES	YES
Year FE	YES	YES
Number of DMAs	56	56
Number of year	8	8
R^2	0.66	0.71

Table 5

OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in the Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
SuperBowlAd × Viewership	2.88	6.231	
	[2.86]	[3.13]	
SuperBowlAd × Team			0.38
			[3.3]
Attention4WeeksAgo	0.035	0.035	0.035
	[1.97]	[2.19]	[2.02]
LogDistance	-0.111	-0.111	-0.111
	[-9.04]	[-9.09]	[-8.72]
Viewership	YES	YES	NO
Team	NO	NO	YES
DMA demographics	YES	YES	YES
DMA FE	YES	YES	YES
Stock × year FE	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		21.77	
R^2	0.28	0.28	0.28

Table 6

Estimating the impact of a win on the post-Super Bowl Monday DMA investment attention for the stocks that advertise in the subsample of DMAs with a local team in the game

This table presents the regression that estimates the impact of a win on the post-Super Bowl Monday DMA investment attention for the stocks that advertise in the subsample of DMAs with a local team in the game. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variable is $SuperBowlAd_{j,t} \times Winner_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and an indicator variable that is equal to one if a team from DMA i wins the Super Bowl in year t ($Winner_{i,t}$). The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), the indicator variable for DMA i's team's win in the Super Bowl in year t ($Winner_{i,t}$), DMA demographics, and DMA fixed effects. The regression has stock-year fixed effects. The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

SuperBowlAd × Winner	0.102
	[0.23]
Attention4WeeksAgo	0.078
	[1.02]
LogDistance	-0.106
	[-11.95]
Winner	YES
DMA demographics	YES
DMA FE	YES
Stock × year FE	YES
Number of DMAs	2
Number of stocks	571
Number of years	8
R^2	0.74

Table 7

OLS and IV regressions of the post-Super Bowl DMA investment attention on the advertising exposure of stocks in the subsamples of DMAs with a low fraction of finance industry employees or a low level of Social Capital Index

This table presents the OLS and IV regressions of the post-Super Bowl DMA investment attention on the advertising exposure of stocks in the subsamples of DMAs with a low fraction of finance industry employees or a low level of Social Capital Index. Panel A refers to the subsample of DMAs with a low fraction of finance industry employees (i.e., the DMAs where the fraction of finance industry employees is below the median). Panel B refers to the subsample of DMAs with a low level of Social Capital Index (i.e., the DMAs where the value of the Social Capital Index is below the median). The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in the Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Regressions in the subsample of DMAs with a low fraction of finance industry employees			
SuperBowlAd × Viewership	2.68	17.151	
	[2.27]	[2.87]	
SuperBowlAd × Team			1.632
			[2.84]
Controls	YES	YES	YES
Number of DMAs	28	28	28
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		10.32	
R^2	0.27	0.27	0.27
Panel B: Regressions in the subsample of DMAs with a low level of Social Capital Index			
SuperBowlAd × Viewership	1.039	11.524	
	[0.96]	[2.19]	
SuperBowlAd × Team			0.802
			[2.2]
Controls	YES	YES	YES
Number of DMAs	28	28	28
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		7.03	
R^2	0.26	0.26	0.26

Table 8

OLS and IV placebo regressions of the pre-Super Bowl DMA investment attention on the advertising exposure of stocks

This table presents the OLS and IV placebo regressions of the pre-Super Bowl DMA investment attention on the advertising exposure of stocks. In Panel A, the dependent variable is $AttentionFriBef_{i,j,t}$, i.e., DMA i's investment attention on stock j on the pre-Super Bowl Friday in year t. In Panel B, the dependent variable is $AttentionMonBef_{i,j,t}$, i.e., DMA i's investment attention on stock j on the pre-Super Bowl Monday in year t. In both panels, the independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a local team from DMA i appears in the Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Placebo regressions of the pre-Super Bowl Friday DMA investor attention			
SuperBowlAd × Viewership	-0.361	-1.512	
	[-0.68]	[-1.35]	
SuperBowlAd × Team			-0.099
			[-1.26]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		21.77	
R^2	0.23	0.23	0.23
Panel B: Placebo regressions of the pre-Super Bowl Monday DMA investor attention			
SuperBowlAd × Viewership	0.698	0.225	
	[1.36]	[0.15]	
SuperBowlAd × Team			0.015
			[0.15]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		21.77	
R^2	0.25	0.25	0.25

Table 9

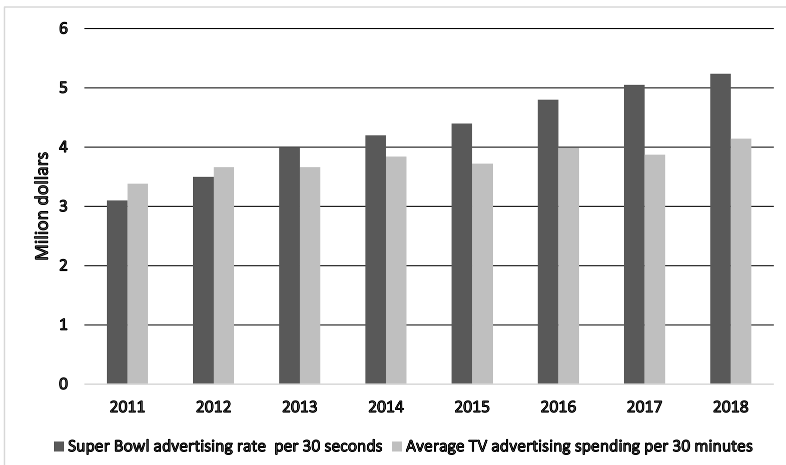
OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of local and non-local stocks

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of local and non-local stocks. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variables are (i) $Away_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is non-local and has a high ad exposure in DMA i in year t, (ii) $Local_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is local and has a high ad exposure in DMA i in year t, and (iii) $Local_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is local in DMA i and has a low ad exposure in DMA i in year t. The base group is $Away_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an an indicator variable which is equal to one if stock j is non-local and has a low ad exposure in DMA i in year t. The instrument of $HighView_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. In Panel A, the distance threshold for local stocks is 100 miles. In Panel B, the distance threshold for local stocks is 250 miles. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $HighView_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Local stocks based on a 100 miles distance threshold			
Away100mi × (SuperBowlAd × HighView)	0.675	1.081	
	[4.97]	[3.36]	
Local100mi × (SuperBowlAd × HighView)	1.752	1.771	
	[1.83]	[1.86]	
Local100mi × (1 - SuperBowlAd × HighView)	0.416	0.42	
	[5.8]	[5.77]	
Away100mi × (SuperBowlAd × Team)			0.966
			[3.78]
Local100mi × (SuperBowlAd × Team)			1.855
			[2.14]
Local100mi × (SuperBowlAd × Team)			0.418
			[5.69]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		20.58	
R^2	0.28	0.28	0.09
Panel B: Local stocks based on a 250 miles distance threshold			
Away250mi × (SuperBowlAd × HighView)	0.712	1.313	
	[5.24]	[2.97]	
Local250mi × (SuperBowlAd × HighView)	0.631	0.662	
	[2.08]	[2.22]	
Local250mi × (1 - SuperBowlAd × HighView)	0.181	0.187	
	[5.9]	[6.02]	
Away250mi × (SuperBowlAd × Team)			1.157
			[3.38]
Local250mi × (SuperBowlAd × Team)			0.748
			[1.93]
Local250mi × (SuperBowlAd × Team)			0.178
			[5.59]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		14.1	
R^2	0.28	0.28	0.28

Fig. 1. The Super Bowl 30-second advertising rate and the Super Bowl total advertising expenditure by year. This figure depicts the Super Bowl advertising rate per 30 seconds and the total Super Bowl advertising expenditure for every year during the sample period. Subfigure 1a shows the average cost of a 30-second TV advertisement during the Super Bowl (depicted with dark gray color and extracted from Forbes) versus the average advertising expenditure on network, spot, syndication and cable TV every 30 minutes (depicted with light grey color and extracted from Kantar Media's Ad$ Summary). Both these variables are expressed in millions of dollars. Subfigure 1b shows the total advertising expenditure during the Super Bowl (depicted with dark gray color) versus the total advertising expenditure during the Super Bowl pregame shows (depicted with light gray color) and the total advertising expenditure during the Super Bowl postgame shows (depicted with black color). These advertising expenditures are also expressed in millions of dollars (and are extracted from Nielsen's Ad Intel, without being currently available for the year 2018). The Super Bowl pregame shows refer to all the Super Bowl-related shows that air on national TV on a Super Bowl Sunday from noon until the start of the game. The Super Bowl postgame shows refer to all the Super Bowl-related shows that air on national TV on a Super Bowl Sunday after the game until midnight.

(a) Super Bowl advertising rate per 30 seconds versus the average TV ad expenditure per 30 minutes



(b) Total Super Bowl ad expenditure versus total ad expenditure of Super Bowl pre-and postgame shows

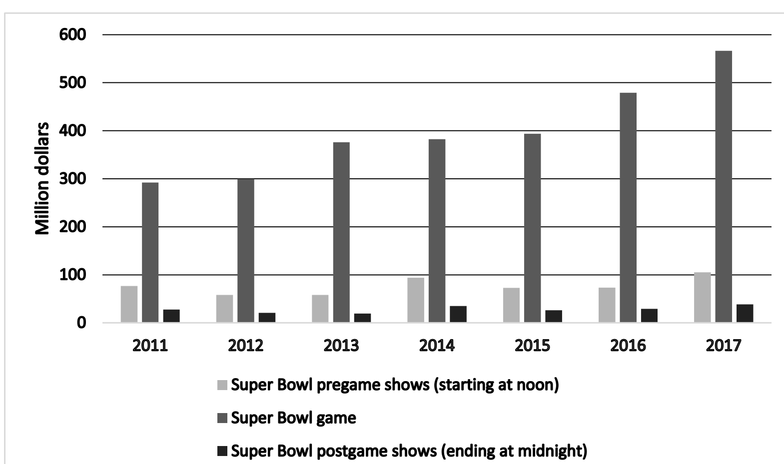
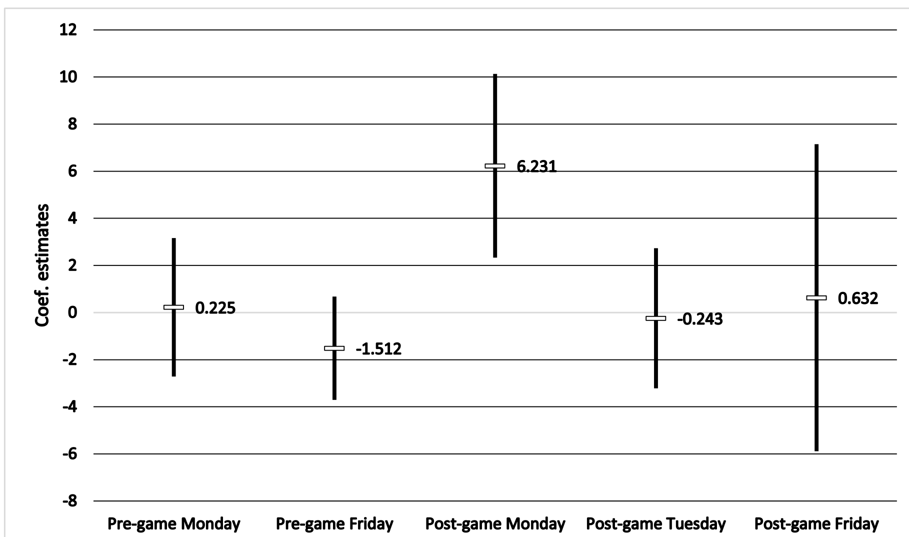


Fig. 2. IV regression coefficient estimates of the pre- and post-Super Bowl DMA investment attention on the advertising exposure of stocks. The dependent variables are DMA i's investment attention on stock j in year t on (i) the pre-Super Bowl Monday ($AttentionMonBef_{i,j,t}$), (ii) the pre-Super Bowl Friday ($AttentionFriBef_{i,j,t}$), (iii) the post-Super Bowl Monday ($Attention_{i,j,t}$), (iv) the post-Super Bowl Tuesday ($AttentionTueAft_{i,j,t}$), and (v) the post-Super Bowl Friday ($AttentionFriAft_{i,j,t}$). The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a local team from DMA i appears in the Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Subfigure 2a shows the 2SLS coefficient estimates. Subfigure 2b shows the reduced form coefficient estimates (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The point estimates are depicted with a white dash. The 95% confidence intervals are depicted with solid black lines.

(a) 2SLS coefficient estimates of the pre- and post-Super Bowl DMA investment attention



(b) Reduced form coefficient estimates of the pre- and post-Super Bowl DMA investment attention

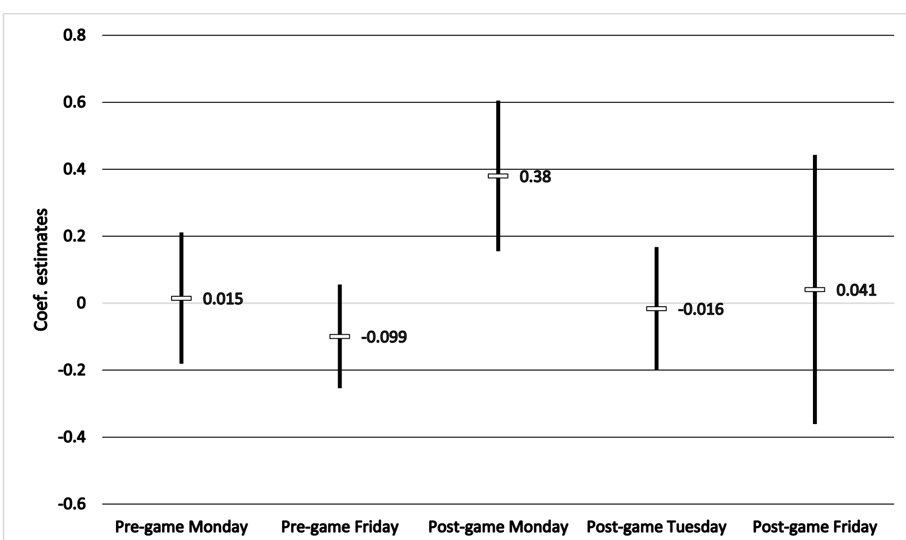
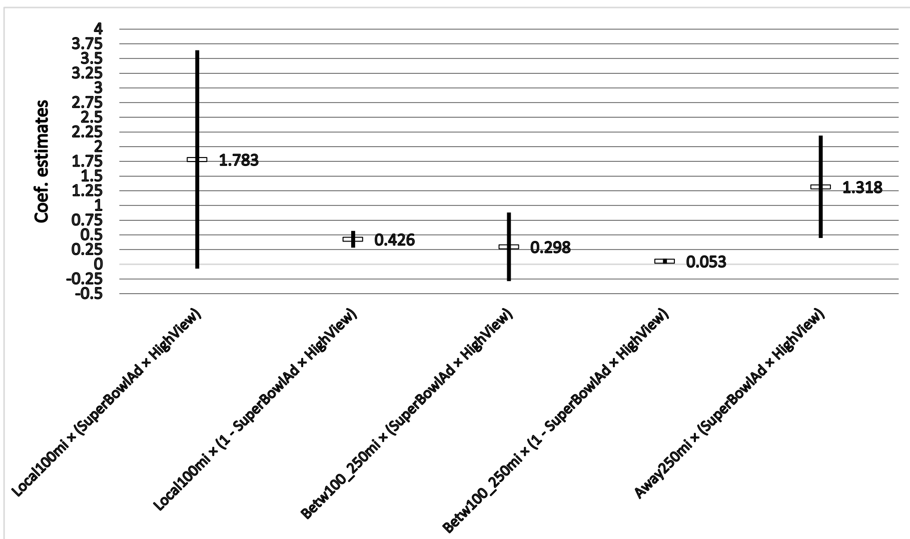
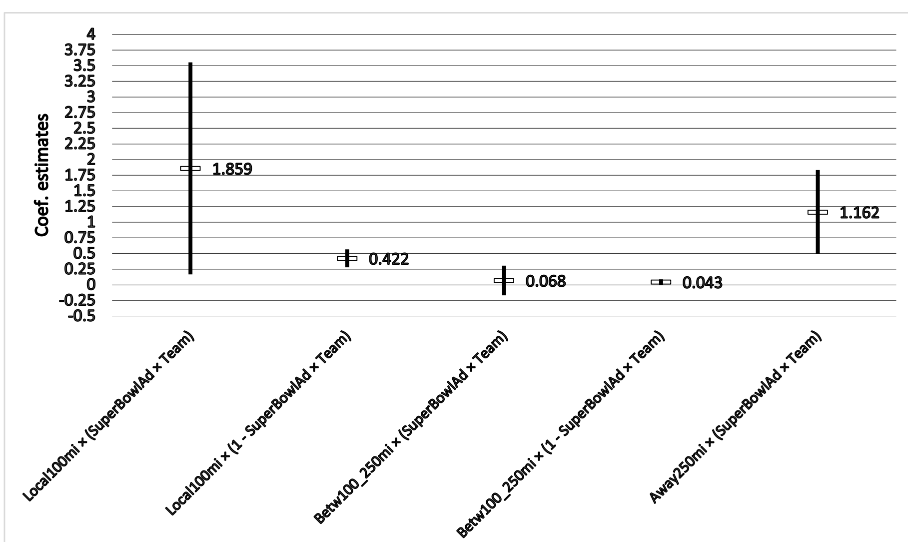


Fig. 3. Coefficient estimates of the IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on their geographical proximity. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variables are (i) $Local100mi_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 miles away and has a high ad exposure in DMA i in year t, (ii) $Local100mi_{i,j,t} \times (1 - Ad_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 miles away in DMA i and has low ad exposure in DMA i in year t, (iii) $Betw100\_250mi_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 250 miles away and has a high ad exposure in DMA i in year t, (iv) $Betw100\_250mi_{i,j,t} \times (1 - Ad_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 250 miles away and has a low ad exposure in DMA i in year t, and (v) $Away250mi_{i,j,t} \times (Ad_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is more than 250 miles away and has a high ad exposure in DMA i in year t. The base group is $Away250mi_{i,j,t} \times (1 - Ad_{j,t} \times HighView_{i,t})$, i.e., an an indicator variable which equals one if stock j is more than 250 miles away and has a low ad exposure in DMA i in year t. The instrument of $HighView_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that equals one if a local team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Subfigure 3a shows the 2SLS. Subfigure 3b shows the reduced form (where $HighView_{i,t}$ is replaced by $Team_{i,t}$). The point estimates are depicted with a white dash. The 95% confidence intervals are depicted with solid black lines.

(a) 2SLS coefficient estimates of the post-Super Bowl Monday DMA investment attention



(b) Reduced form coefficient estimates of the post-Super Bowl Monday DMA investment attention



Online Appendix

Construction of the local investment interest variable

For the purposes of this study, we need to measure the fraction of searches for each stock in each DMA. However, Google Trends limits the requests so that they contain at most five terms per query. Hence a single query cannot give us the DMA interest for each of the 571 stocks in the investment universe. To work around this limitation, we put aside one of the stocks and use it as a benchmark, splitting all the other stocks into groups of four. The benchmark, which we choose to be Apple, is then added to each group. As we explain below, having this benchmark allows us to make comparisons between the groups.

When we make a request to Google Trends, we send a triplet $(\mathcal{I}, \mathcal{J}, t)$ to the website, where $\mathcal{I}$ is the set of DMAs in the United States, $\mathcal{J}$ is the set of "Name of Company + Stock" - terms (each linked to a stock j), and t is the post-Super Bowl Monday (or the Monday 4 weeks before the Super Bowl, or the pre-Super Bowl Monday or Friday, or the post-Super Bowl Tuesday or Friday). Google Trends then returns to us a table with the Search Volume Index (SVI) for each DMA i in set $\mathcal{I}$ and each term j in set $\mathcal{J}$ in period t.

The index provided by Google Trends is the number of searches in location i for term j in period t ($x_{i,j,t}$) scaled by the number of searches for the all terms in $\mathcal{J}$ ($\sum_{\tilde{j}\in\mathcal{J}} x_{i,\tilde{j},t}$).[25] Therefore, if we denote by $y_{i,j,t,\mathcal{J}}$ the share of interest in location i for stock j out of the total interest for all the stocks in group $\mathcal{J}$ in period t, then the SVI that Google returns is:

$$y_{i,j,t,\mathcal{J}} = \frac{x_{i,j,t}}{\sum_{\tilde{j}\in\mathcal{J}} x_{i,\tilde{j},t}}.$$

After obtaining the SVIs for all the terms in all the groups, we calculate a relative attention index, defined as:

$$A_{i,j,t,j_{bench}} = \frac{y_{i,j,t,\mathcal{J}}}{y_{i,j_{bench},t,\mathcal{J}}} = \frac{x_{i,j,t}}{x_{i,j_{bench},t}}.$$

[25]In order to lower computational costs, Google calculates the number of searches from a sample of the actual searches. As we explain below, we perform repeated searches to reduce the noise from this sampling, and to lower the bias that comes from Google returning only integer values for the SVIs.

This index does not depend on the group each stock was arbitrarily put into, but depends on the common benchmark. Note that $A_{i,j_{bench},t,j_{bench}} = 1$, while all the other A's are proportional to the benchmark stock.

Lastly, to obtain our local investment attention measure ($Attention_{i,j,t}$), which is independent of our benchmark choice, we normalize again as follows:

$$Attention_{i,j,t} = \frac{A_{i,j,t,j_{bench}}}{\sum_{\tilde{j}\in\mathcal{U}} A_{i,\tilde{j},t,j_{bench}}} = \frac{\frac{x_{i,j,t}}{x_{i,j_{bench},t}}}{\sum_{\tilde{j}\in\mathcal{U}} \frac{x_{i,\tilde{j},t}}{x_{i,j_{bench},t}}} = \frac{x_{i,j,t}}{\sum_{\tilde{j}\in\mathcal{U}} x_{i,\tilde{j},t}},$$

where $\mathcal{U}$ is the universe of stocks in our sample. Thus, we can interpret the variable $Attention_{i,j,t}$ as a relative interest, or the fraction of searches for stock j relative to the searches for all the stocks in our sample.

We note that there are three caveats with the numbers returned by Google Trends (as pointed out by Stephens-Davidowitz and Varian (2014)). The first one is that the numbers are obtained from a sample of Google searches. The sample size is such that the Google Trends results for most common queries are not affected by the sampling. However, that can add noise to infrequently searched terms in small geographical areas in short periods of time, which is the case for some of our queries. Google Trends uses a new sample every few hours, so the same query made on different days may return different results.

The second caveat is that the Google Trends numbers are rounded to the nearest integer. This implies that comparisons between search terms with low SVIs may be imprecise, as rounding can have a large relative effect in the index.

Nevertheless, we can use the first caveat to solve for the second one. By performing the search 30 times, and averaging the SVIs, we lower the noise that arises from the sampling, while obtaining better approximations of the underlying, non-integer, SVIs.

The third caveat, is that when the total number of searches for a term is below a certain (unannounced) threshold the SVI is rounded down to 0. This makes it impossible to compare unpopular search terms. While this could be an issue, this feature would bias our results towards 0, and so our estimates are actually strengthened by this source of noise.

Appendix Table 1

List of stocks with recognizable advertising exposure in the Super Bowl by year

This table lists the stocks with recognizable advertising exposure in the Super Bowl by year. For every year in the sample period, the Super Bowl commercials are extracted from the USA Today Ad Meter and matched with the stock names of their companies in the Center for Research in Security Prices (CRSP). A stock is then considered to have recognizable advertising exposure in the Super Bowl if (i) a commercial is about its company, or (ii) a commercial is about a product whose name overlaps with its company name, or (iii) a commercial displays its company logo. Stocks of firms with multiple Super Bowl commercials in a single year are considered to be recognizable if they can be recognized from at least one ad.

	Year							
Company name	2011	2012	2013	2014	2015	2016	2017	2018
GOOGLE INC (ALPHABET INC)							✓	
AMAZON COM INC						✓	✓	✓
ANHEUSER BUSCH INBEV SA NV	✓	✓	✓	✓	✓	✓	✓	✓
BANK OF AMERICA CORP				✓				
BEST BUY COMPANY INC	✓	✓	✓					
BLOCK H & R INC							✓	
CARMAX INC	✓			✓				
COCA COLA CO	✓	✓	✓	✓	✓	✓	✓	✓
COLGATE PALMOLIVE CO						✓		
COMCAST CORP NEW		✓	✓		✓	✓	✓	✓
DISCOVER FINANCIAL SERVICES					✓			
DISNEY WALT CO	✓	✓	✓		✓	✓	✓	✓
E TRADE FINANCIAL CORP	✓	✓	✓					✓
FIAT CHRYSLER AUTOMOBILES NV					✓		✓	
FITBIT INC						✓		
FORD MOTOR CO DEL				✓			✓	
GENERAL ELECTRIC CO		✓						
GENERAL MILLS INC				✓				
GODADDY INC							✓	
GROUPON INC								✓
INTEL CORP							✓	
INTUIT INC				✓	✓	✓	✓	✓
KRAFT HEINZ CO						✓		✓
MCDONALDS CORP					✓			
METLIFE INC		✓						
MICROSOFT CORP				✓	✓			
MONSTER BEVERAGE CORP NEW								✓
MOTOROLA SOLUTIONS INC	✓							
NETFLIX INC							✓	✓
PAYPAL HOLDINGS INC						✓		
PEPSICO INC	✓	✓	✓	✓	✓	✓	✓	✓
RADIOSHACK CORP				✓				
SKECHERS U S A INC	✓	✓	✓		✓			✓
SPRINT CORP NEW				✓	✓		✓	✓
SUNTRUST BANKS INC						✓		
T MOBILE U S INC				✓	✓	✓	✓	✓
TWENTY FIRST CENTURY FOX INC						✓	✓	
VERIZON COMMUNICATIONS INC	✓							✓
VIACOM INC NEW	✓	✓	✓	✓	✓	✓	✓	✓
WEIGHT WATCHERS INTL INC NEW					✓			
WENDYS CO							✓	✓

Appendix Table 2

Summary statistics of the Super Bowl viewership by local market for the years 2011-2018

This table presents the summary statistics of the Super Bowl viewership for each of Nielsen' s top 56 metered markets during the years 2011-2018. The number of times that a DMA's local team appears in the Super Bowl is presented next to its name [in brackets].

DMA [Super Bowl appearances of local team]	Mean	S.D.	Min	Max
Albuquerque-Santa Fe NM	48.1	4	44.7	56.9
Atlanta GA [1]	50.9	2.9	47.1	57
Austin TX	47.1	2.6	43.1	50.6
Baltimore MD [1]	50.8	3.8	47.4	59.6
Birmingham AL	49.8	3.5	43.2	54.5
Boston MA-Manchester NH [4]	53.4	4.4	48	61
Buffalo NY	54.6	1.8	52.7	57.3
Charlotte NC [1]	50.9	2.7	46.7	55.7
Chicago IL	48	3.6	44.2	54.9
Cincinnati OH	49.5	2.2	45.6	51.6
Cleveland-Akron (Canton) OH	50.7	1.2	48.9	52.3
Columbus OH	52.7	2.7	48.8	56.2
Dallas-Ft. Worth TX	49.2	3	43.4	53.7
Dayton OH	51.2	2.7	46.3	54.6
Denver CO [2]	51.6	2.2	48	54.1
Detroit MI	49.2	2.8	46.5	55
Ft. Myers-Naples FL	49.5	2.8	44	52.7
Greensboro-High Point-Winston Salem NC	50.4	2.8	47.7	56.4
Greenville-Spartanburg SC-Asheville NC-Anderson SC	51.5	2.7	47.9	56.3
Hartford & New Haven CT	48.3	2.7	45.8	54
Houston TX	45.6	1.5	43.5	47.6
Indianapolis IN	53.3	2.4	49.3	56.4
Jacksonville FL	52.6	2.3	48	55.3
Kansas City MO	53.9	2	52.1	58.1
Knoxville TN	50.4	3	46.9	56.4
Las Vegas NV	50.7	3.7	42.6	54.2
Los Angeles CA	41.3	1.1	40	43.4
Louisville KY	48.3	1.8	44.9	50.2
Memphis TN	49.3	3.6	42.4	53.8
Miami-Ft. Lauderdale FL	39.7	2.2	37.8	43
Milwaukee WI [1]	53.9	2.5	52	59.7
Minneapolis-St. Paul MN	52.1	3.1	46.4	54.9
Nashville TN	52.9	3.3	46.2	57.9
New Orleans LA	52.3	4.7	42.6	57.1
New York NY [1]	47	3.6	41.6	52.2
Norfolk-Portsmouth-Newport News VA	55	1	53.9	56.6
Oklahoma City OK	49.2	3.2	42.8	52.6
Orlando-Daytona Beach-Melbourne FL	50	2.8	44.4	53
Philadelphia PA [1]	50.2	2.7	47.9	56.2
Phoenix AZ	48.6	3.8	43.5	55.6
Pittsburgh PA [1]	54.9	2.6	52.2	59.7
Portland OR	46.1	4.6	39.4	52.4
Providence RI-New Bedford MA	48.7	3.4	45.1	54.6
Raleigh-Durham (Fayetteville) NC	48.3	1.7	44.9	50.1
Richmond-Petersburg VA	52.6	2.6	49.1	56.3
Sacramento-Stockton-Modesto CA	47.3	3.5	41.2	52.4
Salt Lake City UT	42	3.4	37.5	46.2
San Antonio TX	48	1.9	44.9	49.9
San Diego CA	46.9	1.7	44.4	49.4
San Francisco-Oakland-San Jose CA [1]	44.8	2.3	42.4	49.1
Seattle-Tacoma WA [2]	50.7	3.5	45.4	56.7
St. Louis MO	46.5	2.6	41.6	48.8
Tampa-St. Petersburg (Sarasota) FL	49.8	1.8	46.5	52.1
Tulsa OK	48.8	3.5	42.9	53.9
Washington DC (Hagerstown MD)	52.5	2.1	50.6	56.9
West Palm Beach-Ft. Pierce FL	49.6	1.3	47.7	51.3

Appendix Table 3

OLS and IV triple-DID regressions of the DMA investment attention on the advertising exposure of stocks

This table presents the OLS and IV triple DID regressions of DMA investment attention on the advertising exposure of stocks. In Panel A, a time window between the pre-Super Bowl Friday and the post-Super Bowl Monday is specified for every year t. In Panel B, a time window between the pre-Super Bowl Monday and the post-Super Bowl Monday is specified for every year t. The dependent variable is $Attention_{i,j,t,\tau}$, i.e., DMA i's investment attention on stock j in year t on the pre-Super Bowl ($\tau = 0$) or post-Super Bowl ($\tau = 1$) calendar date. $Post_{t,\tau}$ is an indicator variable that is equal to one after year t's Super Bowl has happened. $SuperBowlAd_{j,t}$ is an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t. $Viewership_{i,t}$ is DMA i's Super Bowl viewership in year t. The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in the Super Bowl in year t. The list of controls includes stock-DMA fixed effects, DMA demographics, and stock-calendar date fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Pre-Super Bowl Friday versus post-Super Bowl Monday DMA investor attention			
Post × SuperBowlAd × Viewership	3.258	7.732	
	[2.82]	[3.15]	
Post × SuperBowlAd × Team			0.478
			[2.63]
SuperBowlAd × Viewership	YES	YES	NO
Post × Viewership	YES	YES	NO
Viewership	YES	YES	NO
SuperBowlAd × Team	NO	NO	YES
Post × Team	NO	NO	YES
Team	NO	NO	YES
Stock × DMA FE	YES	YES	YES
DMA demographics	YES	YES	YES
Stock × calendar date FE	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		27.89	
R^2	0.33	0.33	0.33
Panel B: Pre-Super Bowl Monday versus post-Super Bowl Monday DMA investor attention			
Post × SuperBowlAd × Viewership	2.181	6.004	
	[2.5]	[2.89]	
Post × SuperBowlAd × Team			0.365
			[2.41]
SuperBowlAd × Viewership	YES	YES	NO
Post × Viewership	YES	YES	NO
Viewership	YES	YES	NO
SuperBowlAd × Team	NO	NO	YES
Post × Team	NO	NO	YES
Team	NO	NO	YES
Stock × DMA FE	YES	YES	YES
DMA demographics	YES	YES	YES
Stock × calendar date FE	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		27.89	
R^2	0.29	0.29	0.29

Appendix Table 4

OLS and IV regressions of the post-Super Bowl Tuesday and Friday DMA investment attention on the advertising exposure of stocks

This table presents the OLS and IV regressions of the post-Super Bowl Tuesday and Friday DMA investment attention on the advertising exposure of stocks. In Panel A, the dependent variable is $AttentionTueAft_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Tuesday in year t. In Panel B, the dependent variable is $AttentionFriAft_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Friday in year t. In both panels, the independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in the Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Regressions of the post-Super Bowl Tuesday DMA investor attention			
SuperBowlAd × Viewership	-1.043	-0.243	
	[-1.34]	[-0.16]	
SuperBowlAd × Team			-0.016
			[-0.17]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		21.77	
R^2	0.24	0.24	0.24
Panel B: Regressions of the post-Super Bowl Friday DMA investor attention			
SuperBowlAd × Viewership	-0.783	0.632	
	[-0.87]	[0.19]	
SuperBowlAd × Team			0.041
			[0.2]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		21.77	
R^2	0.25	0.25	0.25

Appendix Table 5

OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks in the subsample of years when 100% of the ad inventory is sold out about one month before the Super Bowl

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks in the subsample of years when 100% of the ad inventory is sold out about one month before the Super Bowl. As shown in Table 1, these are the years 2011-2014. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investor attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
SuperBowlAd × Viewership	4.787	9.466	
	[2.52]	[3.1]	
SuperBowlAd × Team			0.541
			[3.87]
Attention4WeeksAgo	0.016	0.016	0.016
	[5.01]	[5.01]	[5.02]
LogDistance	-0.112	-0.112	-0.112
	[-6.84]	[-6.27]	[-6.87]
Viewership	YES	YES	NO
Team	NO	NO	YES
DMA demographics	YES	YES	YES
DMA FE	YES	YES	YES
Stock × year FE	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	4	4	4
First-stage F-statistic		11.85	
R^2	0.23	0.23	0.23

Appendix Table 6

OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks in the subsample that drops stocks that air Super Bowl ads only in the years when a local team appears in the game

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks in the subsample that drops stocks that air Super Bowl commercials only in the years when a team from the DMA where they are headquartered appears in the Super Bowl. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
SuperBowlAd × Viewership	2.864	4.764	
	[2.69]	[2.73]	
SuperBowlAd × Team			0.292
			[2.6]
Attention4WeeksAgo	0.035	0.035	0.036
	[2.12]	[2.18]	[1.75]
LogDistance	-0.11	-0.11	-0.11
	[-8.12]	[-9.12]	[-8.36]
Viewership	YES	YES	NO
Team	NO	NO	YES
DMA demographics	YES	YES	YES
DMA FE	YES	YES	YES
Stock × year FE	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	569	569	569
Number of years	8	8	8
First-stage F-statistic		21.22	
R^2	0.28	0.28	0.28

Appendix Table 7

OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks in the subsample of DMAs with an NFL team

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks in the subsample of DMAs with an NFL team (i.e., in every year, DMAs without an NFL team are dropped). The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
SuperBowlAd × Viewership	0.77	5.511	
	[1.11]	[3.73]	
SuperBowlAd × Team			0.312
			[3.42]
Attention4WeeksAgo	0.082	0.082	0.082
	[3.09]	[3.54]	[3.45]
LogDistance	-0.105	-0.105	-0.105
	[-7.88]	[-9.21]	[-8.5]
Viewership	YES	YES	NO
Team	NO	NO	YES
DMA demographics	YES	YES	YES
DMA FE	YES	YES	YES
Stock × year FE	YES	YES	YES
Number of DMAs	30	30	30
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		21.29	
R^2	0.365	0.365	0.365

Appendix Table 8

Distribution of the stocks with non-recognizable ad exposure in the Super Bowl by year

This table presents the distribution of the stocks with non-recognizable advertising exposure in the Super Bowl by year. Row 1 shows their total number. Rows 2-18 show the industries of the stocks based on the 17 Fama-French industry portfolios.

	Year							
	2011	2012	2013	2014	2015	2016	2017	2018
Total Number	2	3	8	4	5	7	4	3
Industry								
Food			1				1	
Mines								
Oil								
Clothes			1					
Consumer durables						1		
Chemicals								
Drugs, soap, perfumes & tobacco			2		1	2	1	1
Construction						1		
Steel								
Fabricated products								
Machines				1				
Cars	1	1	1	1	1	1	1	1
Transportation								
Utilities								
Retail stores			1		1	1	1	
Finance		1	1	1	2	1		
Services	1	1	1	1				1

Appendix Table 9

OLS and IV placebo regressions of the post-Super Bowl Monday DMA investment attention on the non-recognizable advertising exposure of stocks

This table presents the OLS and IV placebo regressions of the post-Super Bowl Monday DMA investment attention on the non-recognizable advertising exposure of stocks. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. In Panel A, the independent variable is $SuperBowlAdRnR_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a recognizable or non-recognizable Super Bowl commercial in year t ($SuperBowlAdRnR_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). In Panel B, the independent variables are $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a recognizable Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), and $SuperBowlAdUnrec_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a non-recognizable Super Bowl commercial in year t ($SuperBowlAdUnrec_{j,t}$) with DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in the Super Bowl in year t. In both panels, the list of controls includes DMA i's investor attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Regressions on the advertising exposure of stocks regardless of its recognizably			
SuperBowlAdRnR × Viewership	2.243	5.988	
	[2.06]	[2.24]	
SuperBowlAdRnR × Team			0.328
			[2.26]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		19.51	
R^2	0.27	0.27	0.27
Panel B: Regressions on the recognizable versus non-recognizable advertising exposure of stocks			
SuperBowlAd × Viewership	2.883	6.27	
	[2.86]	[3.16]	
SuperBowlAdUnrec × Viewership	0.58	0.619	
	[0.44]	[0.67]	
SuperBowlAd × Team		0.281	0.382
			[3.31]
SuperBowlAdUnrec × Team			-0.183
			[-0.41]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		12.4	
R^2	0.28	0.28	0.28

Appendix Table 10

OLS and IV regressions of the post-Super Bowl DMA investment attention on the characteristics of the advertising exposure of stocks

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the characteristics of the advertising exposure of stocks. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. In Panel A, the independent variable is $AdLength_{j,t} \times Viewership_{i,t}$, i.e., the interaction between the length of the commercials that stock j airs during the Super Bowl in year t ($AdLength_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). In Panel B, the independent variable is $AdRating_{j,t} \times Viewership_{i,t}$, i.e., the interaction between the average likeability rating (in the *USA Today* Super Bowl Ad Meter) of the commercials that stock j airs during the Super Bowl in year t ($AdRating_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Panel A: Regressions on the length of the advertising exposure of stocks			
AdLength × Viewership	0.037	0.061	
	[2.42]	[3.13]	
AdLength × Team			0.004
			[2.51]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		23.55	
R^2	0.28	0.28	0.28
Panel B: Regressions on the likeability of the advertising exposure of stocks			
AdRating × Viewership	0.505	1.156	
	[2.93]	[2.94]	
AdRating × Team			0.072
			[2.71]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		18.17	
R^2	0.28	0.28	0.28

Appendix Table 11

OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on their geographical proximity

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on their geographical proximity. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variables are (i) $Away250mi_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is more than 250 miles away and has a high advertising exposure in DMA i in year t, (ii) $Betw100\_250mi_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 250 miles away and has a high advertising exposure in DMA i in year t, (iii) $Betw100\_250mi_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 250 miles away and has a low advertising exposure in DMA i in year t, (iv) $Local100mi_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 miles away and has a high advertising exposure in DMA i in year t, and (v) $Local100mi_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 miles away in DMA i and has low advertising exposure in DMA i in year t. The base group is $Away250mi_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an an indicator variable which is equal to one if stock j is more than 250 miles away and has a low advertising exposure in DMA i in year t. The instrument of $HighView_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $HighView_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Away250mi × (SuperBowlAd × HighView)	0.711	1.318	
	[5.22]	[2.96]	
Betw100_250mi × (SuperBowlAd × HighView)	0.265	0.298	
	[0.91]	[1]	
Betw100_250mi × (1 - SuperBowlAd × HighView)	0.047	0.053	
	[2.19]	[2.57]	
Local100mi × (SuperBowlAd × HighView)	1.756	1.783	
	[1.84]	[1.88]	
Local100mi × (1 - SuperBowlAd × HighView)	0.42	0.426	
	[5.83]	[5.8]	
Away250mi × (SuperBowlAd × Team)			1.162
			[3.39]
Betw100_250mi × (SuperBowlAd × Team)			0.068
			[0.56]
Betw100_250mi × (1 - SuperBowlAd × Team)			0.043
			[1.91]
Local100mi × (SuperBowlAd × Team)			1.859
			[2.15]
Local100mi × (1 - SuperBowlAd × Team)			0.422
			[5.72]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		10.67	
R^2	0.28	0.28	0.28

Appendix Table 12

OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on different thresholds of their geographical proximity

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on different thresholds of their geographical proximity. The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variables are (i) $Away450km_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is more than 450 kilometers away and has a high advertising exposure in DMA i in year t, (ii) $Betw100\_450km_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 450 kilometers away and has a high advertising exposure in DMA i in year t, (iii) $Betw100\_450km_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 450 kilometers away and has a low advertising exposure in DMA i in year t, (iv) $Local100_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 kilometers away and has a high advertising exposure in DMA i in year t, and (v) $Local100_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 kilometers away in DMA i and has low advertising exposure in DMA i in year t. The base group is $Away450km_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an an indicator variable which is equal to one if stock j is more than 450 kilometers away and has a low advertising exposure in DMA i in year t. The instrument of $HighView_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $HighView_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Away450km × (SuperBowlAd × HighView)	0.723	1.373	
	[5.3]	[2.94]	
Betw100_450km × (SuperBowlAd × HighView)	0.204	0.238	
	[0.75]	[0.86]	
Betw100_450km × (1 - SuperBowlAd × HighView)	0.052	0.059	
	[2.52]	[2.9]	
Local100km × (SuperBowlAd × HighView)	2.514	2.549	
	[1.63]	[1.66]	
Local100km × (1 - SuperBowlAd × HighView)	0.597	0.603	
	[5.37]	[5.38]	
Away450km × (SuperBowlAd × Team)			1.207
			[3.36]
Betw100_450km × (SuperBowlAd × Team)			0.097
			[0.69]
Betw100_450km × (1 - SuperBowlAd × Team)			0.046
			[2.1]
Local100km × (SuperBowlAd × Team)			2.775
			[2.27]
Local100km × (1 - SuperBowlAd × Team)			0.602
			[5.3]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	571	571	571
Number of years	8	8	8
First-stage F-statistic		9.53	
R^2	0.28	0.28	0.28

Appendix Table 13

Linear probability regressions of the stocks' industry indicators on the average values of indicators of their geographical proximity from the DMAs in the sample

This table presents the linear probability (trivariate) regressions of stocks' industry indicators on the average values of indicators of their geographical proximity from the DMAs in the sample. In each column, the dependent variable is one of the 17 Fama-French industry indicator variables for stock j. The independent variables are (i) $\overline{Local100mi}_{j,t} \equiv \frac{1}{56}\sum_{i=1}^{56} Local100mi_{i,j,t}$, i.e., the average value of the indicator variable which is equal to one if stock j's headquarters are at most 100 miles away from DMA i in year t, and (ii) $\overline{Betw100\_250mi}_{j,t} \equiv \frac{1}{56}\sum_{i=1}^{56} Betw100\_250mi_{i,j,t}$, i.e., the average value of the indicator variable which is equal to one if stock j's headquarters are between 100 and 250 miles away from DMA i in year t. The base group is $\overline{Away250mi}_{j,t} \equiv \frac{1}{56}\sum_{i=1}^{56} Away250mi_{i,j,t}$, i.e., the average value of the indicator variable which is equal to one if stock j's headquarters are more than 250 miles away from DMA i in year t. The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the stock and year level. See Table 2 for details.

	(1) Food	(2) Mines	(3) Oil	(4) Clothes	(5) Consumer durables
$\overline{Local100mi}$	-0.63	-0.778	-2.208	0.475	0.288
	[-1.07]	[-2.41]	[-3.22]	[1.22]	[0.87]
$\overline{Away100Local250mi}$	0.166	0.106	-0.175	0.082	0.164
	[0.8]	[0.56]	[-0.87]	[0.93]	[1.23]
Number of stocks	571	571	571	571	571
Number of years	8	8	8	8	8
R^2	0.00	0.01	0.02	0.01	0.00
	(6) Chemicals	(7) Drugs, etc.	(8) Construction	(9) Steel	(10) Fabricated products
$\overline{Local100mi}$	-0.26	1.48	-0.98	-0.1	-0.11
	[-0.68]	[2.2]	[-2.13]	[-0.24]	[-0.82]
$\overline{Away100Local250mi}$	0.36	0.04	0.42	0.11	-0.09
	[1.62]	[0.14]	[1.77]	[0.75]	[-1.13]
Number of stocks	571	571	571	571	571
Number of years	8	8	8	8	8
R^2	0.01	0.01	0.02	0.00	0.01
	(11) Machines	(12) Cars	(13) Transportation	(14) Utilities	(15) Retail stores
$\overline{Local100mi}$	1.855	-0.762	-1.357	-0.311	0.051
	[1.79]	[-1.43]	[-2.13]	[-0.48]	[0.07]
$\overline{Away100Local250mi}$	-1.815	0.274	0.14	0.175	-0.414
	[-4.87]	[1.74]	[0.68]	[0.62]	[-1.58]
Number of stocks	571	571	571	571	571
Number of years	8	8	8	8	8
R^2	0.05	0.01	0.01	0.00	0.00
	(16) Finance	(17) Services			
$\overline{Local100mi}$	2.269	1.086			
	[1.75]	[0.9]			
$\overline{Away100Local250mi}$	0.682	-0.228			
	[1.6]	[-0.49]			
Number of stocks	571	571			
Number of years	8	8			
R^2	0.01	0.00			

Appendix Table 14

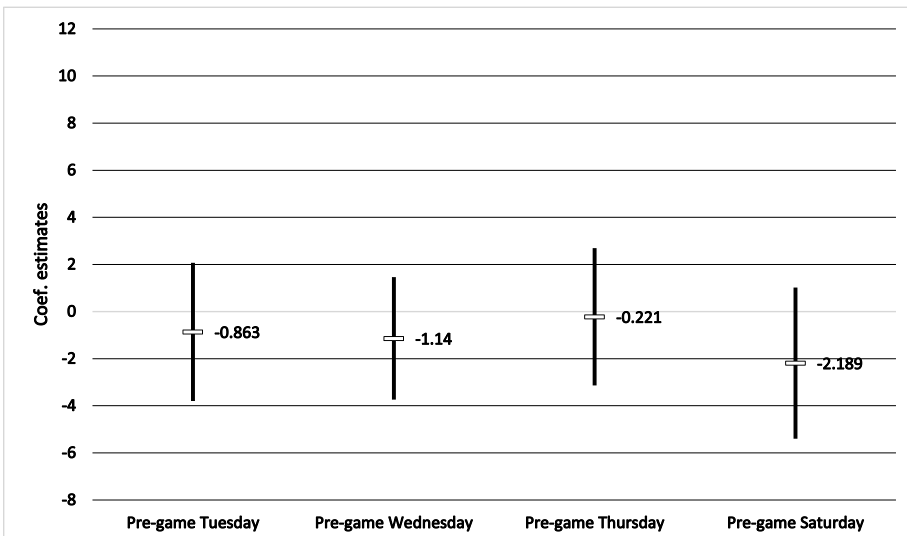
OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on their geographical proximity in the subsample of stocks that are not more or less likely to be local based on their industry

This table presents the OLS and IV regressions of the post-Super Bowl Monday DMA investment attention on the advertising exposure of stocks based on their geographical proximity after dropping stocks in industries that are more or less likely to be local (i.e., Mines, Oil, Drugs etc., Construction, Machines and Transportation as shown in online Appendix Table 13). The dependent variable is $Attention_{i,j,t}$, i.e., DMA i's investment attention on stock j on the post-Super Bowl Monday in year t. The independent variables are (i) $Away250mi_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is more than 250 miles away and has a high advertising exposure in DMA i in year t, (ii) $Betw100\_250mi_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 250 miles away and has a high advertising exposure in DMA i in year t, (iii) $Betw100\_250mi_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is between 100 and 250 miles away and has a low advertising exposure in DMA i in year t, (iv) $Local100mi_{i,j,t} \times (SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 miles away and has a high advertising exposure in DMA i in year t, and (v) $Local100mi_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an indicator variable which is equal to one if stock j is at most 100 miles away in DMA i and has low advertising exposure in DMA i in year t. The base group is $Away250mi_{i,j,t} \times (1 - SuperBowlAd_{j,t} \times HighView_{i,t})$, i.e., an an indicator variable which is equal to one if stock j is more than 250 miles away and has a low advertising exposure in DMA i in year t. The instrument of $HighView_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a team from DMA i appears in Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Column 1 shows the OLS. Column 2 shows the 2SLS. The first-stage F-statistic tests the hypothesis that the coefficient of the instrument is zero. Column 3 shows the reduced form (where $HighView_{i,t}$ is replaced by $Team_{i,t}$). The table depicts the coefficient estimates and the t-statistics [in brackets] based on two-way clustered standard errors at the DMA and year level. See Table 2 for details.

	(1) OLS	(2) 2SLS	(3) Reduced form
Away250mi × (SuperBowlAd × HighView)	0.647	1.25	
	[4.75]	[2.84]	
Betw100_250mi × (SuperBowlAd × HighView)	0.208	0.244	
	[0.71]	[0.82]	
Betw100_250mi × (1 - SuperBowlAd × HighView)	0.049	0.057	
	[2.05]	[2.38]	
Local100mi × (SuperBowlAd × HighView)	1.697	1.726	
	[1.8]	[1.84]	
Local100mi × (1 - SuperBowlAd × HighView)	0.317	0.324	
	[6.11]	[6.18]	
Away250mi × (SuperBowlAd × Team)			1.098
			[3.23]
Betw100_250mi × (SuperBowlAd × Team)			0.036
			[0.29]
Betw100_250mi × (1 - SuperBowlAd × Team)			0.044
			[1.73]
Local100mi × (SuperBowlAd × Team)			1.798
			[2.13]
Local100mi × (1 - SuperBowlAd × Team)			0.321
			[5.71]
Controls	YES	YES	YES
Number of DMAs	56	56	56
Number of stocks	414	414	414
Number of years	8	8	8
First-stage F-statistic		9.11	
R^2	0.30	0.30	0.30

Fig. 1. IV regression coefficient estimates of the DMA investment attention on the advertising exposure of stocks on the other days of the pre-Super Bowl week. The dependent variables are DMA i's investment attention on stock j in year t on (i) the pre-Super Bowl Tuesday ($AttentionTueBef_{i,j,t}$), (ii) the pre-Super Bowl Wednesday ($AttentionWedBef_{i,j,t}$), (iii) the pre-Super Bowl Thursday ($AttentionThuBef_{i,j,t}$), and (iv) the pre-Super Bowl Saturday ($AttentionSatBef_{i,j,t}$). The independent variable is $SuperBowlAd_{j,t} \times Viewership_{i,t}$, i.e., the interaction between an indicator variable that is equal to one if stock j airs a Super Bowl commercial in year t ($SuperBowlAd_{j,t}$) and DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$). The instrument of $Viewership_{i,t}$ is $Team_{i,t}$, i.e., an indicator variable that is equal to one if a local team from DMA i appears in the Super Bowl in year t. The list of controls includes DMA i's investment attention on stock j four weeks before the Super Bowl ($Attention4WeeksAgo_{i,t}$), the log of the average distance of DMA i's ZIP-Codes from stock j's headquarters' ZIP-Code in year t ($LogDistance_{i,j,t}$), DMA i's Super Bowl viewership in year t ($Viewership_{i,t}$), DMA demographics, and DMA fixed effects. All regressions have stock-year fixed effects. Subfigure 2a shows the 2SLS coefficient estimates. Subfigure 2b shows the reduced form coefficient estimates (where $Viewership_{i,t}$ is replaced by $Team_{i,t}$). The point estimates are depicted with a white dash. The 95% confidence intervals are depicted with solid black lines.

(a) 2SLS coefficient estimates of the pre-Super Bowl DMA investment attention



(b) Reduced form coefficient estimates of the pre-Super Bowl DMA investment attention