Advertising Spending and Media Bias: Evidence from News Coverage of Car Safety Recalls*

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ABSTRACT

Do media outlets bias news content in favor of advertisers? We study this question by examining automobile manufacturer advertising in U.S. newspapers and news coverage of major safety recalls between 2000 and 2014. Examining car safety recalls allows us to separate the influence of advertisers from the influence of readers, who presumably demand *more* coverage about the safety risks associated with the recall. Consistent with the predictions of our theoretical model, recalls involving a given manufacturer receive significantly less coverage on newspapers in which that manufacturer advertised more over the previous two years. This is true for both the extensive and intensive margins of coverage, and the effects are also stronger for more severe recalls. We find that pro-advertiser bias is more pronounced in markets with less competitive pressure, indicating that competition - and the related reputational concerns - mitigates advertiser capture. Moreover, increased competition for advertising revenues from online platforms makes newspapers more vulnerable to the pressure of advertisers. Highlighting the potential importance of relationships, the effects are also strongest when small newspapers receive advertising from local dealers. Finally, we provide suggestive evidence that news coverage of manufacturer recalls is negatively correlated with fatalities associated with that manufacturer.

Keywords: media bias, advertising, newspapers, car manufacturers, safety recalls

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1. INTRODUCTION

An independent press is essential to inform citizens about relevant policy issues and to expose government as well as corporate misconduct (Strömberg and Snyder, 2010; Dyck et al., 2008). Because media are important for the formation of public opinion, powerful private and political interests can have an incentive to "capture" them to promote friendly coverage and deter hostile reporting (Besley and Prat, 2006).

The debate over the risks of media capture has primarily focused on the potential impact of government control and private ownership on media freedom (Corneo, 2006; Petrova, 2008; Durante and Knight, 2012). One question that has been less explored is the extent to which media editorial decisions are vulnerable to the pressures of advertisers. Indeed, commercial outlets rely heavily on advertising revenues and have an interest in maintaining a good relationship with their advertisers. When negative news about an advertiser emerges, an outlet may consider under-reporting due to a relationship with advertisers. While newspapers do attempt to separate the editorial and marketing sides of their business, real-world examples suggest that advertisers can sometime influence editorial decisions.[1] For example, the Daily Telegraph, a British newspaper, was accused of providing limited coverage of tax scandals involving Swiss bank HSBC, one of its largest advertisers (Plunkett and Ben, 2015).[2] This type of bias can be particularly insidious because it may be difficult for readers to recognize the conflict of interest and discount the bias accordingly (Chiang and Knight, 2011).

From an empirical point of view, the two-sided nature of media markets makes it difficult to identify the causal impact of ad spending on media bias. On the one hand, consumers have preferences over content that they like to see confirmed (Gentzkow and Shapiro, 2010). On the other hand, advertisers have preferences over consumers, as they aim to reach individuals with specific characteristics that make them more receptive to their message (Chen et al., 2009; Joshi et al., 2011). Profit-maximizing media outlets can slant content either to cater to

[1] For example, the first point on The New York Times' standards and ethics guidelines states that: "the goal of The New York Times is to cover the news as impartially as possible - "without fear or favor"....Thus The Times and members of its news department and editorial page staff share an interest in avoiding conflicts of interest or an appearance of a conflict". For more detail see http://www.nytco.com/who-we-are/culture/standards-and-ethics/ for details.

[2] According to Peter Oborne, former Telegraph chief political commentator, the paper had discouraged stories critical of HSBC since the bank suspended its advertising following a Telegraph's investigation. He also reported that a former Telegraph's executive defined HSBC as "the advertiser you literally cannot afford to offend".

the preferences of consumers (demand-driven bias) or to the demands of advertisers (supply-driven bias). Because the two are inextricably linked, and typically push content in the same direction, disentangling one effect from the other can be challenging. As a consequence, any correlation between ad spending and content should not necessarily be interpreted as evidence of a causal effect of advertisers' influence on content. This issue affects existing studies that have examined the influence of advertisers on newspapers and casts a doubt as to what the influence of advertisers on media might actually be.

To overcome this challenge, our analysis focuses on a situation in which preferences of readers and advertisers should affect content in opposite directions. Specifically, we investigate the relationship between advertising by car manufacturers in U.S. newspapers and news coverage of car safety recalls. It is natural to assume that advertisers prefer less coverage, which might damage their reputation.[3] On the other hand, readers naturally demand more information about the associated safety risks and the competence of the manufacturer in dealing with recalls. Two additional aspects make this case an ideal testing ground. First, since car manufacturers account for a substantial share of total advertising spending, media outlets are unlikely to ignore their demands. Second, because car defects can sometimes result in serious accidents, this case illustrates the importance of media scrutiny and the potential social costs of the lack of corporate accountability due to media capture.

We first develop a simple model predicting that, in equilibrium, advertisers receive favorable coverage via a reduction in coverage of recalls. In order to test this prediction, our empirical analysis is based upon four data sources. First, we measure recalls by focusing on the top 100 recalls in terms of the number of potentially affected vehicles issued between 2000 and 2014.[4] Second, we collect detailed data on the number of recall-related articles published in about 115 US daily newspapers (both national and local) for the entire sample period, for a total of over 13,600 articles. Third, we incorporate information on advertising spending in these newspapers by automobile manufacturers. Finally, to measure demand-side preferences, we employ survey data on the distribution of car ownership by manufacturer at the media market level. The availability of manufacturer-specific data allows us to estimate the impact of ad spending on news coverage controlling for advertiser-newspaper

[3] See http://www.autonews.com/Assets/pdf/NADA%20UCG_WhitePaper_Impact%20of%20Vehicle%20Recalls.pdf for an analysis based on a few recent case studies.

[4] The top 100 recalls concern nine large manufacturers which, as of 2015, accounted for about 87% of the U.S. car market.

fixed effects and manufacturer-specific local demand and thus to separate supply-driven bias from demand-driven bias.

We find that newspapers in which a given manufacturer advertises more are less likely to write about recalls involving vehicles produced by that manufacturer. In particular, advertising by a manufacturer over the previous two years is associated with both a lower probability that the newspaper will publish any article on the recall and a reduction in the number of articles published. The effect is robust and quite sizeable: a 10% increase in ad spending in the prior two years reduces the likelihood of recall-related coverage by 35%, and the number of recall-related articles by 20%. We also find that these effects are strongest for the most severe recalls, potentially reflecting the importance of these recalls for the reputation of manufacturers.

Investigating the dynamics, we find that a medium-to-long term advertising relationship between firms and newspapers is conducive to friendly coverage, while ad spending in the few months prior to a recall has no significant effect on coverage. We find no evidence that advertisers withdraw spending in response to more extensive coverage of recalls; this result further supports the view that the relationship we identify is due to prior spending influencing later editorial decisions.

After documenting the existence and magnitude of pro-advertiser bias, we explore whether competitive pressure mitigates or exacerbates any such bias. First we define markets in which newspapers face competitive pressure, i.e. in which the number of competing newspapers is above the median.[5] We find that pro-advertiser bias is more pronounced in markets where competition is low, suggesting that competition and the related reputation concerns have a disciplining effect on editorial choices. We then examine whether newspapers experiencing financial distress due to increased competition from online platforms became more vulnerable to the pressures of advertisers.[6] To do so, following Seamans and Zhu (2013), we exploit the staggered introduction of Craigslist - the world's largest online platform for

[5] We define the market of a newspaper as the Metropolitan Statistical Area that the newspaper is headquartered in. The median number of newspapers in a market is two.

[6] This conjecture is consistent with previous findings showing that media companies that are financially solid and able to raise independent revenues are more likely to resist capture. (Petrova, 2011) provides evidence that the growth of advertising revenues was one of the drivers of the development of an independent press in late nineteenth century U.S.. Using an instrumental variable approach, she finds that in places with higher ad revenues, newspapers were more likely to enter the market as independents. Consistent results are found by Qin et al. (2014) who, looking at contemporary China, find that newspapers that depend more on commercial revenues are less directly controlled by the Communist Party and less likely to report low-level corruption.

classified ads - across U.S. media markets. We find that, after the entry of Craigslist and the associated financial distress, newspapers became more reluctant to write about the recalls of their advertisers. As one would expect, the effect is stronger for newspapers that relied more heavily on classified ads, for which the entry of Craigslist represented a bigger shock. We also find no evidence of newspaper ownership patterns influencing recall-related coverage decisions. In particular, a manufacturer advertising in a newspaper is not able to influence coverage decisions of another newspaper which is owned by the same company-neither in the same newspaper market nor across different markets.

Finally, we examine the heterogeneity of our results across newspapers and advertisers. Bias is most pronounced for large newspapers, for large manufacturers, and for domestic manufacturers. Highlighting the potential importance of relationships, we also find that bias is most pronounced when small newspapers receive advertising from local dealers.

Finally, we show that the distortion of recall related coverage due to advertising revenue has potentially important consequences. In particular, lower news coverage of a manufacturer's recall, in the month following the recall announcement, is associated with higher deaths involving that manufacturer's vehicle. This provides suggestive evidence of the informative value of recall related news. This result, in tandem with the findings relating to advertising and coverage, indicate that sustained advertising from car manufacturers could distort coverage and lead to an increase in road fatalities.

Our research contributes to the growing literature on the role of mass media in consolidated democracies. In particular, it relates to and improves upon the few previous studies on the influence of advertisers on media editorial decisions. Looking at three personal finance publications and two national newspapers Reuter and Zitzewitz (2005) find that advertising spending by a mutual fund family is systematically associated with more favorable recommendations for that family's funds though only in personal finance publications. Focusing on four Argentinian newspapers, Di Tella and Franceschelli (2011) document that newspapers in which the government advertises more are less likely to report on corruption scandals involving government officials. Using data on advertising spending by 13 Italian companies on 6 newspapers, Gambaro and Puglisi (2015) find that newspapers on which a given company purchases more ads are more likely to publish articles about that company, especially following that company's press releases. Looking at US newspapers, Beattie (2017) finds that advertising from firms in carbon emitting industries decreases the quantity of coverage

of climate change and shifts the tone of coverage towards climate skepticism. Finally, looking at US local newspapers, Gurun and Butler (2012) find that the news coverage of local companies is significantly more positive than that of non-local ones and provide evidence that this may be due to higher advertising spending on local newspapers by local firms. As mentioned above, identification in this strand of literature often faces the threat that consumer demand is an omitted variable, which generally pushes content in the same direction as advertisers' preferences. Our strategy allows us to address this issue by: i) focusing on an situation in which the interests of advertisers and consumers work in opposite directions, and ii) by explicitly accounting for a measure of consumer demand. Our analysis also improves upon previous work in that it looks at much larger number of newspapers over a longer time period. This wealth of data and longer time frame allow us to further qualify our findings by testing whether news bias is driven by shorter or longer term relationship between advertisers and media outlets, an aspect which previous work has disregarded.

More generally, our results, by documenting that advertisers' pressure can deter media from adequately covering issues on which readers' interests conflict with advertisers' reputational concerns, complement previous evidence that media cater to the preferences of readers (Gentzkow and Shapiro, 2010; Sen and Yildirim, 2015). Also, our results that competition in the newspaper market reduces supply-side media bias dovetail nicely with previous results on 19th century U.S. newspapers (Gentzkow et al., 2015; Galvis et al., 2016) and suggest an additional rationale for regulation aimed at limiting concentration in media ownership. Also, our findings complement the evidence presented in Seamans and Zhu (2013) that newspapers' advertising revenues from classified ads decreased due to the entry of online competitors by suggesting that financial weakness may have lead to less editorial independence. This result is especially informative about the risks of media capture by corporate interests at a time when numerous media outlets experience financial distress and become increasingly vulnerable to outside pressures. Finally, our result on ownership patterns not influencing media bias is in line with Gentzkow and Shapiro (2010) who find that political preferences of newspaper owners does not influence media slant and DellaVigna and Hermle (2016) who find no bias in movie reviews in favor of companies which have a financial stake in the movie and are part of the same media conglomerate.

The remainder of the paper is organized as follows. Section 2 provides an overview of both newspaper advertising by car manufacturers and vehicle recalls. Section 3 provides

the basic theoretical model along with several extensions. Section 4 describes the data, while Section 5 lays out the empirical framework. Section 6 details our benchmark results, Section 7 describes how market structure interacts with media bias, and Section 8 analyzes some of the heterogeneity of the baseline estimates. Section 9 investigates the implications for fatalities, and Section 10 concludes.

2. Background

2.1. Newspaper Advertising by Automotive Firms

Advertising accounts for a large share of newspapers' total revenues around the world and up to 80% in the United States (FTC, 2010). Car manufacturers are among newspapers' largest advertisers; as of 2006, total ad spending by the automotive sector amounted to over 20 billion dollars, 40% of which benefited the printed press (Ellman and Germano, 2009).[7] Reliance on advertising by newspapers raises the concern that editorial decisions may be vulnerable to the influence of advertisers, especially the biggest ones.

2.2. Recalls and Car Manufacturers

Car safety recalls are managed by the National Highway Traffic Safety Administration (NHTSA). When a manufacturer becomes aware of a potentially faulty part, they are obliged to report it to the NHTSA, which makes public information about the recall, including details about the defective part and the number of affected vehicles. By law, the manufacturer is required to provide a free remedy to the problem and notify owners of affected vehicles. Notices include information on the nature of the problem, the associated risks, how an owner can access the free remedy, how long the repair will take, and a description of what owners can do if they are not able to have the affected vehicle repaired.

Because owners are directly notified by manufacturers via recall notices, one might argue that media coverage of recalls does not matter. On the other hand, there is evidence that many recall letters never reach owners of recalled vehicles.[8] There are at least two reasons for recall letters not reaching owners. First, notices will only be delivered to owners of used vehicles if the manufacturer uses updated information from state DMV systems,

[7] According to a report by Advertising Age, a marketing research, three of the top ten national advertisers in 2015 were car manufacturers, namely GM (#3), Ford (#6) and Fiat Chrysler Automobiles (#8).

[8] See https://www.edmunds.com/car-safety/recalled-but-unrepaired-cars-are-a-safety-risk-to-consumers.html for additional details.

and, by law, manufacturers are not required to do so. Second, owners who move without forwarding their mail will also not receive the notice. In addition to current owners, potential buyers in the used car market may benefit from media coverage of recalls since sellers in this market are not required to disclose recalls. Finally, even among owners who do receive the recall notice, the media may provide additional information. For example, media coverage often provides information about the number of vehicles affected and about other recent recalls by manufacturers. This information is not required and is not generally included in recall letters, but it may affect the perceptions held by both owners and potential owners of recalled vehicles. Finally, consumers who do not own a recalled vehicle, but are considering buying one from a given manufacturer, may want to learn about the quality of the vehicles and of the capacity of the manufacturer to deal with problematic situations. For all of these reasons, the media may provide additional valuable information to newspaper readers about product recalls.

3. MODEL

Consider a model in which newspapers provide coverage of recalls and value both readers and advertisers. While readers prefer coverage of recalls, advertisers prefer that coverage be censored. We begin with a simple model of a single newspaper and a single advertiser but later extend the model in a variety of ways, including consideration of competition between newspapers for readers and also competition in the market for advertisers.

3.1. SETUP

More formally, a product recall occurs with probability p. Given a recall, newspapers can either provide coverage of the recall for their readers or censor the information. A unit mass of readers receive value equal to v from coverage of recalls. The idiosyncratic benefits from reading a newspaper, regardless of recall, equal b_i, which is distributed across readers uniformly over the interval $[\mu - \frac{1}{2\xi}, \mu + \frac{1}{2\xi}]$. Finally, readers pay subscription price ρ. Given all of this, expected payoffs for consumer i from reading a newspaper with coverage equal $b_i + pv - \rho$, and reading a paper without coverage yields a payoff equal to $b_i + \rho$. Readers subscribe if the expected payoff from doing so is positive, with markets shares of σ_c with coverage and σ_n without coverage.

Newspapers sell papers at (exogenous) copy price ρ and face marginal costs m and

fixed costs F. Newspapers also have the option, as described more fully below, to censor coverage of recalls in exchange for advertising spending (a). Then, newspaper profits equal $(\rho - m)\sigma_c - F$ with coverage and $(\rho - m)\sigma_n - F + a$ without coverage.

In the absence of a recall, manufacturer payoffs equal π. Given a recall and under media coverage, manufacturer payoffs equal $\pi - \sigma_c d$, where d is the damage to the reputation of the manufacturer associated with media coverage, and this damage only applies to readers. Given a recall and under an agreement with the newspaper, manufacturer profits equal $\pi + \sigma_n e - a$, where e is the per-reader economic benefit from advertising, independent of the censoring motive.

The game proceeds as follows. In the first stage, manufacturers make a credible offer of advertising in exchange for censoring. In the second stage, newspapers accept or reject the offer. In the third stage, and conditional on newspaper coverage policies, readers decide whether or not to subscribe. Finally, nature chooses whether or not a recall occurs and outcomes are realized.

3.2. EQUILIBRIUM

Working backwards, market shares under coverage and censorship equal:

$$\sigma_c = 0.5 + \xi(\mu + pv - \rho)$$

$$\sigma_n = 0.5 + \xi(\mu\text{-}\rho)$$

Thus, the boost in readership from coverage equals $\sigma_c - \sigma_n = \xi pv$. This is increasing in the density of marginal readers, the likelihood of a recall, and the benefits to readers from coverage of recalls.

Newspapers are willing to accept offers that provide them higher profits, when compared to profits under coverage. That is, newspapers accept when $(\rho - m)\sigma_n - F + a > (\rho - m)\sigma_c - F$. Using the results above, the minimum required advertising is thus equal to:

$$a = (\rho - m)\xi pv$$

This represents the drop in subscription revenue, net of production costs, associated with the loss in reputation. Given this, manufacturers are willing to enter an agreement when profits

are higher under no coverage (i.e., $\pi + \sigma_n e - a > \pi - p\sigma_c d$). Substituting in market shares and minimum advertising levels, this can be written as:

$$d > \frac{(\rho - m)\xi pv - e[0.5 + \xi(\mu - \rho)]}{p[0.5 + \xi(\mu + pv - \rho)]}$$

These agreements are more likely when the damage to the manufacturer (d) is higher and when the economic benefits of advertising (e) are large. They are more likely when newspaper marginal costs (m) are higher, as this reduces newspaper profit margins.

To summarize, the key prediction here is that only advertisers receive favorable coverage from newspapers. We next separately consider six extensions of the model, which provide additional predictions to test in our empirical analysis. Details are provided in the Appendix, with only a short description here.

3.3. Intensive margin extension

While the baseline model considered the decision by newspapers over whether or not to cover recalls, we now consider the number of such articles (the intensive margin). Readers have a most-preferred number of articles, with utility declining as the number of articles is reduced from that point. There is also a per-article damage to the reputation of the manufacturer. Manufacturers now offer newspapers a certain amount of advertising in exchange for a certain number of recall articles. The key prediction here is that newspapers are willing to reduce the number of articles for each dollar of advertising received.

3.4. Severity extension

The next extension involves consideration of recall severity. In particular, we consider two types of recalls, severe and moderate. Readers receive higher value from coverage of severe recalls, and manufacturers receive more damage from coverage of severe recalls. Newspapers can decide whether to provide coverage of all recalls, no recalls, or only moderate recalls. Manufacturers choose to make one of two types of offers: 1) censoring of all coverage or 2) censoring of only coverage of severe recalls. The key prediction here is that, under certain conditions, manufacturers prefer agreements to censor only coverage of severe recalls. In particular, this is the case when the damage to manufacturers from coverage of severe recalls is sufficiently high and the damage to manufacturers from coverage of moderate

recalls is sufficiently low.

3.5. Competition for readers extension

While the baseline model considered a single newspaper, we next consider an extension to multiple newspapers competing for readers. For simplicity, we assume that newspapers are perfect substitutes. That is, when all newspapers suppress coverage, newspapers equally split the market share under no coverage. But when only one newspaper provides coverage, that newspaper captures the entire market share under coverage. In this case, newspapers can gain significant market share from unilaterally rejecting agreements. Thus, the key prediction here is that each newspaper requires higher advertising, reducing the return to advertising for manufacturers.

3.6. Advertising market competition extension

Next, we consider competition in the advertising market. In particular, should an agreement not be reached with the manufacturer, the newspaper can sell the associated advertising slots at some price, which can be considered the market price for classified advertising. As this market price falls, newspapers have less leverage with manufacturers, and required advertising levels fall. Thus, the key prediction here is that the return to advertising from manufacturers increases as the market price for classified advertising falls.

3.7. Transactions costs extension

The fifth extension involves transactions costs. In particular, in order to transfer a given amount to a newspaper, manufacturers have to advertise at higher levels. The key prediction here is that when transactions costs are high, the returns to advertising are low, and when transactions costs are low, the returns to advertising are high. Empirically, we proxy for low transactions costs using hypothesized relationships between small newspapers, relative to large newspapers, and advertising from local dealers, relative to advertising from national manufacturers.

3.8. PRIVATE INFORMATION EXTENSION

The final extension involves manufacturer private information about recalls. In particular, if manufacturers know whether or not a recall is forthcoming, they will only advertise in the recall state of the world. Given this, newspapers require higher advertising in order to suppress information since they receive no advertising when a recall is not forthcoming. Given this, the key prediction here is that the returns to advertising are lower when manufacturers have private information.

4. DATA

For our empirical analysis we use data on: i) car safety recalls, ii) news coverage of recalls, iii) advertising spending by car manufacturers, and iv) vehicle ownership by manufacturer and by media market.

4.1. CAR SAFETY RECALL DATA

Comprehensive data on all car safety recalls issued in the US between 2000 and 2014 are available from the National Highway Traffic Safety Administration (NHTSA). For each recall, the NHTSA reports information on the make, model(s), and vehicle's part(s) concerned by the recall, and on the number of vehicles potentially affected. We focus on manufacturers involved in the top one hundred recalls, in terms of the number of vehicles potentially affected, over our 15-year sample period.[9] Since major recalls often concern multiple models, we aggregate and analyze the data at the manufacturer level.[10] Overall, we consider more than 1800 recalls involving a total of nine car manufacturers, including Chrysler, Ford, General Motors, Honda, Hyundai, Kia, Nissan, Toyota and Volkswagen. These car manufacturers are the nine largest in the U.S. accounting for over 87 percent of the market share, as of 2015.[11]

[9] Each of the top one hundred recalls concerned affected atleast 680,000 vehicles with the mean number of potentially affected vehicles being about 1.4 million vehicles.

[10] The mean number of models affected by each recall is 8.5.

[11] See https://www.statista.com/statistics/249375/us-market-share-of-selected-automobile-manufacturers/ for more details.

4.2. NEWS COVERAGE DATA

Data on news coverage of recalls in US newspapers for the period 2000-14 are obtained from the Newslibrary.com database. To identify recall-related articles, we performed an automated search of specific keywords over full text articles to minimize the probability of both false positives and false negatives. Specifically, an article is deemed to concern a recall if it contains the word "safety" and the word "recall" and the name of a manufacturer (e.g., "General Motors"or "Ford").[12] Recall-related articles are then assigned to a manufacturer, or multiple manufacturers, based on whether the name of the manufacturer is mentioned in the article.[13] Finally, based on the date the article was published, we assign the article to a specific month. Data on news coverage of recalls are hence organized by manufacturer-newspaper-month. Overall, we collected data on coverage for 115 daily US newspapers for a total of 13,600 recall-related articles.

As shown in Table 1, there is a 7.1 percent probability that a newspaper writes a recall-related article about a particular manufacturer in a given month, with the mean number of articles equal to 0.118. Moreover, the timing of articles is strongly correlated with recall events. In particular, Figure 1, documents a post-recall increase in articles that include both the basic search terms and recall-specific phrases, such as air bag or fire. Coverage spikes during and immediately after a recall, and lasts up to 4 months.

To provide readers with information on the content of recall articles, we read a subsample of articles from 5 large newspapers.[14] Almost all articles mentioned some information that is not generally available in recall notices provided by manufacturers to owners of affected vehicles. The most common additional information provided was the number of affected vehicles, which can arguably be considered negative news for the manufacturer especially since it is the larger recalls which eventually get covered. Other common pieces of information include the number of accidents, injuries, or deaths caused by the defective part, comparisons with other recent recalls, and quotes and analysis by industry experts. Figure 2

[12] Including the word "safety" reduces the probability that "recall" is used as a synonym for "remember". The NHTSA employs the expression "safety recall" ; hence, although some articles which mention recalls do not use the word "safety", almost all articles including a lengthy discussion of a recall use it.

[13] The same recall-related article can be included more than once in the dataset if it contains the names of multiple manufacturers. This type of articles is not uncommon since some times articles discussing a recall may compare it to other recent recalls, or discuss general NHTSA's recall procedures.

[14] Note that, while we can search over all 115 newspapers, we do not have access to the full text of the articles in many cases. Given this, we read articles from five large newspapers for which we have access to the full text. These include USA Today, Tampa Bay Times (formerly St. Petersburg Times), St. Louis Post-Dispatch, Pittsburgh Post-Gazette, and Atlanta Journal Constitution.

provides a visual representation of the language use in the articles in these five newspapers. As shown, the tone of coverage ranged from neutral to critical, and we did not find any recall related articles which used a positive tone towards the manufacturer of recalled vehicles.

4.3. Advertising Expenditures

Data on advertising spending by both car manufacturers and local car dealers were purchased from the Ad$pender database produced by Kantar Media. The dataset includes monthly advertising spending by manufacturer/dealer, separately by product and newspaper. To estimate actual spending, Kantar Media measures the advertising space dedicated to each product, and then attaches to it a value based on the rates listed by each newspaper. For our analysis we construct a measure of ad spending by each manufacturer/dealer on each newspaper in each month, summing up spending for different products. Specifically, we assign spending for a given product to a manufacturer if the name of the product contains either the name of the manufacturer or the name of one of the brands the manufacturer produces.[15] As shown in Table 1, the average monthly advertising expenditure by a manufacturer in a newspaper is $102,300.

4.4. Vehicle Ownership Information

As a measure of demand for news coverage, information on the distribution of owned vehicles by manufacturer at the local level are available from the National Household Travel Survey (NHTS). The data contain information on a sample of vehicles at the Census Block Group level. To merge them with the newspaper data, we aggregate the NHTS data at the Metropolitan Statistical Areas (MSAs) level; in particular, we assign to each newspaper the shares of vehicles by manufacturer in the MSA where the newspaper's headquarter is located (e.g., the Boston MSA for the *Boston Globe*). Since the NHTS survey was only conducted in 2001 and 2009, data for the other years are imputed via interpolation. As shown in Table 1, the mean market share for a car manufacturer is 8 percent, with a maximum of about 27 percent.

[15] For example, spending for a product whose name includes the words "Toyota" or "Lexus" is assigned to Toyota Inc.

4.5. Road Fatalities Data

To assess the impact of recall-related news coverage on a relevant outcome, we look at fatalities associated with vehicle crashes. This data is provided by NHTSA's Fatality Analysis Reporting System (FARS). This is a nationwide census of vehicle related fatalities with information on the date of the accident, the make of the vehicle involved as well as registration state.[16] We aggregate these data to the state-manufacturer-month level during our sample period 2000-2014.

5. The Empirical Framework

Our baseline specification links coverage to advertising spending as follows:

$$coverage_{mnt} = \alpha + \theta_1 log(\sum_{i=1}^{\tau} advertising_{mn(t-i)}) + \theta_2 demand_{mny} + \theta_3 severity_{mt} + \phi_{mn} + \psi_t + \varepsilon_{mnt}$$

The key outcome $coverage_{mnt}$ is measured in two ways. First, we consider the extensive margin (whether or not an article was written). Second, we consider the intensive margin (the natural log of the number of recall related articles). $advertising_{mn(t-i)}$ represents the amount of advertising spending by manufacturer m on newspaper n at time $t-i$; hence, for example, if i equals 12 the summation term captures total ad spending by manufacturer m on newspaper n in the previous year. We hypothesize that advertising should reduce coverage ($\theta_1 < 0$). $demand_{mny}$ represents the number of vehicles owned made by manufacturer m as a share of total vehicles owned in the area where newspaper n operates in year y. We expect that this time-varying measure of manufacturer demand will be positively related to recall-related coverage since it would be interest of owners of vehicles to seek out information on recall involving the manufacturer of their vehicles. $severity_{mt}$ indicates the number of total vehicles potentially affected by the recall(s) of manufacturer m at time t. We expect that the higher the number of potentially affected vehicles in a particular recall, the more newsworthy or 'important' the story becomes. This may lead to greater news coverage. Finally, we also control for newspaper size by including a variable for the total number of articles published by the newspaper in a year.

Our specification also includes a set of fixed effects. ψ_t captures the aggregate time

[16] Aggregation of the data at finer geographical levels leads to issues of sparsity which could lead to imprecise estimates.

effects which include any other time-specific factor susceptible to affect coverage and/or advertising spending (e.g., seasonality). ϕ_{mn} are manufacturer-newspaper fixed effects which capture time invariant characteristics of the manufacturer-newspaper relationship, including time invariant demand for the manufacturer's brand in that particular geographical market. In order to account for the error term being serially correlated between newspaper-manufacturer pairs, even after accounting for newspaper by manufacturer fixed effects, we cluster standard errors at the newspaper-manufacturer level. This ensures that we do not overestimate the precision of our results.[17]

A key decision involves the time period over which advertising should be measured. In our baseline analysis, we focus on two-year advertising histories and later investigate the dynamics of the relationship.

6. Benchmark Results

We begin our analysis by estimating our baseline specifications examining the link between advertising expenditures and coverage of recalls. We then examine in more detail the role of advertising over different time periods. Finally, we present a series of robustness checks.

6.1. Baseline Results

In Table 2, in columns (1)-(5), we use an indicator for any recall-related articles as our dependent variable. In column (1), we simply regress the total amount of advertising dollars over the past two years on this coverage indicator without including any fixed effects or controls. As shown, the relationship is positive and significant, highlighting that there can be a spurious relationship between coverage and advertising in the absence of controls for demand-side preferences. Inclusion of newspaper-manufacturer fixed effects in column (2) flips the sign on the log of advertising dollars, leading to a negative and statistically significant (at the

[17] The specification we estimate is structurally equivalent to looking at the logarithm of the recall related articles written in a month as a share of the total number of articles written in a year. Looking at the annual number provides a more stable measure of the newspaper size or output. We demonstrate how the results are robust to using the logarithm of the total number of monthly articles as a measure of size, in Table 11.

1% level) impact on the probability of writing a recall-related article. [18] In column (3) we include the following additional controls: a time varying measure of the demand for the manufacturer's vehicles, the number of affected vehicles, and newspaper size. As shown, this increase the coefficient of interest by approximately 25 percentage points, while still being statistically significant at the 1% level. This is in line with intuition since these variables are positively correlated with recall coverage, depressing the coefficient on advertising expenditures if omitted from the regression. Our results are robust to the inclusion of month fixed effects (column 4). In terms of magnitudes, a 10% increase in two year advertising expenditure leads to a decrease in the likelihood of at least one recall related article by 2.7 percentage points. With a mean probability of 0.071, this corresponds to a 35% decline in the probability of an article appearing.[19] Finally, in column (5), we report results from a specification in which we control for newspaper and manufacturer fixed effects separately as opposed to controlling for newspaper-manufacturer fixed effects as in columns (2)-(4). The coefficient is negative and statistically significant at the 5% level but the magnitude is 20 percentage points lower than in column (4). This demonstrates, again, that newspaper-manufacturer fixed effects do capture something substantive about the relationship between the newspaper-manufacturer relationship and the underlying demand characteristics of that media market.

Turning to the intensive margin, we conduct the same analysis with the dependent variable being the total number of recall articles written by a newspaper. As shown in Table 3, advertising spending has a negative and statistically significant impact on the number of articles written by a newspaper across a variety of specifications. The effect is robust to the inclusion of newspaper by manufacturer fixed effects (columns (2)-(4)), controls for manufacturer demand (columns (3) and (4)), the size or the importance of the recall (columns (3) and (4)), and month fixed effects (column (4)). Quantitatively, the estimates imply that a

[18] To provide further evidence on the role of demand-side bias, we examine the decision of manufacturers over where to advertise. We define a geographical market for each newspaper based on the MSA it is has its headquarters in. We then regress the monthly advertising expenditure by a manufacturer in a newspaper on the share of vehicles owned of that manufacturer by consumers living in that region. Table B1 shows that monthly advertising expenditure is positively correlated with contemporaneous (columns (1) and (2)) and lagged demand (columns (3) and (4)) for that manufacturer's vehicles in that geographical market. Using newspaper locations as proxies for regional markets, this indicates that manufacturers target geographies where there is already an underlying taste for their vehicles.

[19] A 10% increase in advertising expenditure over the past two years is economically significant since it amounts to approximately $300,000 which is one standard deviation from the mean monthly advertising expenditure by a manufacturer in a newspaper.

10% increase in two year advertising expenditure leads to a 20% decrease in the number of recall related articles since the mean number of recall-related articles is 0.127. Again, these magnitudes are economically significant. In column (5), when controlling for newspaper and manufacturer fixed effects separately instead of newspaper-manufacturer fixed effects we find results similar to the extensive margin, with a coefficient that is negative and significant but smaller in magnitude relative to the estimate in column (4).

Motivated by our severity extension in the theoretical model, we also test whether bias is more pronounced for more severe recalls. To do so, we create two measures of recall severity. First, based on the vehicle component affected, we create an indicator for recalls due to defects, defined as a problem in the engine, accelerator, brakes, airbags, steering, electrical system, fuel system or powertrain.[20] Second, we create an measure indicating that the number of vehicles affected in a recall is above the median. As shown in Table 4, the interaction between advertising spending and the indicator for defect is negative and statistically significant, and this is the case for both the extensive (column (1)) and intensive (column (2)) margins. Likewise, the interaction effect is negative and statistically significant for a recall involving a large number of vehicles, in terms of both the extensive and intensive margins, (columns (3) and (4), respectively). These results highlight that recalls receiving less coverage are those that are more relevant for consumer safety, suggesting important implications for the social cost of media capture.

6.2. TIMING

While our baseline results use advertising over the past two years, we next investigate advertising over different time periods. In Figure 3, we plot the coefficients of a regression of the number of recall related articles by a newspaper on quarterly ad spending by a manufacturer in that newspaper, conditional on newspaper-manufacturer and calendar month fixed effects. There are two main takeaways from this analysis. First, very short term ad spending (previous 6 months) and extremely long term ad spending (24 months and beyond) have no impact on coverage decisions by the newspaper. Second, it indicates that a medium-term (beyond

[20] These are components which can lead to serious consequences if a defect occurs. Some examples of components which form the baseline category and hence, are not classified as severe are: Latches/Locks/Doors, Equipment (other), Adaptive Equipment, Defroster/Defogger system, Seats, Visibiltiy: Sunroof. It is clear that defects in these vehicle parts would create less of a hazard than those in the severe category. For more on how to classify the seriousness of a recall see http://www.truckinginfo.com/blog/auto-focus/story/2015/09/should-auto-recalls-be-delineated-by-severity.aspx.

6 months and less than 24 months) advertising relationship seems to be driving coverage decisions of the newspaper.

In a regression format, we re-estimate our baseline specifications with a variety of short and longer term lags in Tables 5 (extensive margin) and 6 (intensive margin). As shown, advertising expenditure over the past 6 months (column (1) in Tables 5 and 6) has no statistically significant impact on coverage decisions by the newspaper, with the point estimates being small as well. Moreover, very long lags, such as advertising expenditure between two and three years ago (column (5)), also have no statistically significant impact on either the probability of writing an article (Table 5) or the number of articles being written (Table 6). The point estimates are also small as in the case of the past 6 months of advertising expenditure. Advertising expenditure between the past six months and a year (columns (4)) and between the previous year and two years (columns (5)) are statistically significant, indicating that the variation is coming from a medium-term relationship. In columns (6), these results survive even when we include lags in one specification. More generally, this exercise highlights that it is the medium or long term relationships which drives this media bias and not short term advertising expenditure effects.

Moreover, since the literature (Di Tella and Franceschelli (2011), Puglisi and Gambaro (2015) and Reuter and Ziztewitz (2006)) has focused mainly on short term lags, we zoom into ad spending in months (t-1), (t-2) and (t-3) to ensure we are not missing any short term effects. As shown in Table 7, introducing the short term lags sequentially (columns (1)-(3)) or all at once (column (4)) has no statistically or economically significant relationship with recall related coverage. Introducing longer lags ((months (t-18)-(t-6)) in addition to the short term ones does not affect their significance (columns (5) and (6)) while the longer lags are still significant and of a similar magnitude as in the baseline.

These results indicate that a medium or long term relationship between the advertiser and the newspaper seem to drive media bias. A different dimension of such relationships could be related not only to the quantity of ad spending over the past two years but also how consistently the manufacturer advertised in the newspaper. We test whether a more stable stream of spending leads to an advertiser 'buy' better coverage for itself. We create a dummy variable which equals one if the manufacturer's monthly ad spend had been above the median for each of the 24 months over the past two years. The results in Table 8 shows a clear picture about how being a consistently high spender helps with favorable coverage in

the newspaper. Columns (1) and (2) show that if a manufacturer ad spending is above the monthly median for each of the past 24 months then it leads to a negative and significant impact on recall-related coverage on the extensive and intensive margin. Additionally, when we control for the total amount of spending, we find that the negative effect of the stability of spending persists both on the extensive (column (3)) and intensive (column (4)) margin. This result implies that consistent advertising expenditure, indicative of a more stable relationship between the newspaper and manufacturer, over and above the total amount spent leads to more media bias in favor of the manufacturer.

We also analyze the exact timing of 'payment' in the implicit contract between the manufacturer and the newspaper. In particular, we assess whether the manufacturer punishes (rewards) the newspaper ex-post in the case of more negative (less negative) coverage associated with their recalls over and above their existing advertising relationship. In Figure 4, we plot the coefficients from the regression of the number of recall related articles on short term advertising leads (months $t+1$, $t+2$, ... , $t+6$) , controlling for ad spending over the past two years as well as newspaper-manufacturer and calender month fixed effects. One can clearly see that all advertising leads are statistically insignificant indicating no ex-post payment. We then estimate specifications with the full set of controls, which are presented in Table 9. The results show clearly that all the short term leads (months $t+1$,$t+2$,..., $t+6$) are statistically insignificant on the extensive (columns (1)-(3)) and intensive (columns (4)-(6)) margin. This result displays no significant ex-post reaction by the manufacturer to the newspaper's coverage.

Finally, from a theoretical perspective, the lack of short-run effects can potentially be explained by our private information extension in Section 3. In particular, we show that the returns to advertising are lower when manufacturers have private information about recalls, and this seems more plausible in the short-term than in the medium-term or long-term. This type of adverse selection is often solved in insurance markets by waiting periods, and, while our model is purely static in nature, one could imagine newspapers adopting similar strategies by not rewarding recent advertising with favorable coverage.

6.3. Event Study of Recall Specific Coverage

While our baseline analysis has focused on recall articles in general, those containing a manufacturer's name along with the words "safety" and "recall", we next present an event

study based upon coverage of significant recalls, those with more than 1 million affected vehicles. [21] For each of these events, we add search terms relevant to the recall, such as "air bag" or "fire" and focus on coverage within 6 months of the recall. We then test whether coverage of these recalls is different if advertising in the previous year was higher than the average amount a newspaper receives from the manufacturer of the recalled vehicle.

As shown in Figure 5, newspapers are less likely to cover recalls when it has recently received more advertising than usual from a manufacturer, and this is also true for the intensive margin (see Figure 6). These effects is strongest in the month immediately after the month the recall takes place, with coverage returning to normal after a few months.[22] The results of this analysis demonstrate that the relationships documented in the main specifications apply to coverage of specific recalls.

6.4. Top 50 Recalls, Advertising Campaigns, TV News Coverage of Recalls and Media Bias

We next carry out a series of tests to analyze the robustness of our baseline estimates. First, to ensure that our results are not driven by focusing on the top 100 recalls, we analyze whether our results are robust to analyzing the manufacturers involved in the top 50 recalls.[23] As shown in Table 10, the results from this smaller set of recalls is in line with our baseline estimates for both the extensive (column (1)) and the intensive margin (column (2)). The coefficients on advertising expenditure over the past two years is negative and statistically significant, with the coefficients being larger by 30% compared to the baseline. This is in line with intuition since we would expect advertising relationships to pay dividends for manufacturers involved in relatively larger recalls.

Next, we check whether our results are robust to explicitly controlling for potential advertising campaigns.[24] We define an advertising campaign month as one in which the advertising spending allocated to a newspaper by a manufacturer is above the 90th percentile.

[21] There are 54 of these recalls in our sample.

[22] During this month, a newspaper may not feel obliged to provide public service information about the recall as they would in the month of the recall, but the recall is still recent enough to be discussed, particularly for these very large recalls.

[23] This includes Toyota, Honda, General Motors, Chrysler and Ford. We exclude Hyundai from the list because it was involved in only one top 50 recall while the others had multiple. Our results, are robust to different thresholds and are available upon request.

[24] Note that advertising campaigns and the launch of new vehicle models are seasonal, mainly concentrated in autumn and early winter and hence will be largely captured by the month fixed effects. See Beattie (2015) for more.

In columns (3) and (4) of Table 10, we explicitly control for whether there was an advertising campaign in the previous three, six and nine months. As shown, the estimates are very similar to our baseline estimates. Moreover, in columns (5) and (6), we additionally control for whether a campaign took place three, six and nine months previous to a recall being initiated and again find very similar results.[25]

Finally, we separately control for television coverage of recalls using data on recall-related coverage on evening news broadcasts by the top three U.S. networks (ABC, CBS and NBC) from the Vanderbilt Television News Archive.[26] We aggregate these TV news stories during our sample period to the level of the manufacturer-month. As shown, controlling for whether there is any recall related news story on TV in a particular month, we find that the coefficient on ad spending over the past two years is very similar to our baseline results (columns (7) and (8)). Moreover, the coefficient on the TV news indicator is positive and statistically significant, reflecting a positive correlation in coverage across different news platforms.[27]

6.5. Non Linear Models and Alternative Specifications

In Table 11, we present results using non-linear models. Results from a negative binomial (columns 1) and a logit model for probability of writing any article (column 2) are qualitatively similar to our linear baseline setting.[28] Next, we evaluate whether our results hold if we change the time window for the measure of the size of the newspaper in terms of the number of articles. Instead of using the total annual number of articles written by the newspaper, we use the total monthly articles written in columns (3) and (4) of Table 11. Results are qualitatively and quantitatively in line with our baseline estimates for both the probability of writing an article (column (3)) as well as number of articles (column (4)). In columns (5) and (6), we allow for even more flexible fixed effects by allowing newspaper by manufacturer fixed effects to vary over time (four-year intervals). Even with these flexible fixed

[25] These results are robust to a wide variety of definitions of an advertising campaigns. This also serves as a robustness check for manufacturers, potentially anticipating a recall, changing their advertising strategy which could possibly make the short term advertising lags insignificant. Controlling for these advertising campaigns, leave those results unchanged as well. Further results available upon request.

[26] See Eisensee and Stromberg (2007) for more details on this dataset.

[27] We find similar results when controlling explicitly for the number of news stories instead of a TV news dummy. These results are available upon request from the authors.

[28] We are unable to estimate the specifications with the full set of fixed effects due to convergence issues. Hence, we follow Goldfarb and Tucker (2011) and Latham (2015), who faced the same similar convergence problems, by saturating the model with as many interactions of controls and fixed effects as possible.

effects, we find that the results are in line with those in Tables 2, highlighting the robustness of our estimates. Finally, in columns (7) and (8), we measure advertising over the past two years by a manufacturer as the proportion of total advertising in that newspaper by all car manufacturers. In line with our baseline results, we find that the higher the proportion of ad expenditure by a manufacturer, the lower is the coverage of recalls. This holds for both the extensive (column (7)) and the intensive margin (column (8)).

As a final robustness check to our baseline results, we consider an alternative reporting strategy by newspapers related to how verbose the recall related articles are. We analyze (the logarithm of) the total number of words written in a month by a newspaper in recall related articles associated with a particular manufacturer as the dependent variable of interest. The results in Table 12 are in line with our baseline estimates. If we do not include any fixed effects or time varying demand side controls then we get a spurious positive association between advertising expenditure and the word count of recall related articles (column (1)). As soon as we introduce newspaper-manufacturer fixed effects (column (2)) and time varying controls (column (3)), we see that there is a negative and significant impact of advertising revenue on the number of words written about the manufacturer's recall. This effect persists even with the introduction of month fixed effects (column (4)) or newspaper and manufacturer fixed effects separately (column (5)).

7. Market Structure, Advertising Revenue and Bias

Having established our baseline results, we next analyze the role of market structure and how it interacts with media bias. First, we ask how the presence of competition between newspapers affects media bias. We then study competition in the advertising market via an analysis of the entry of Craigslist, an alternative advertising platform. Next, we assess whether the ownership structure of newspapers feeds into coverage decisions. Finally, we ask whether a newspaper biases its coverage less in favor of an advertiser if it receives a large amount of advertising revenue from other, potentially competing, advertisers.

7.1. Newspaper Competition and Media Bias

We first consider the role of competition between newspapers. As formalized in a theoretical extension, we hypothesize that competition between newspapers may reduce media bias. This is due to both the disciplining effect of newspaper reputation and reader choice between

multiple newspapers, reducing the leverage of advertisers with each individual newspaper.

To define whether a newspaper faces competition, we first count the total number of newspapers with headquarters in that particular MSA. A newspaper is then defined as facing competition if the total number of newspapers in the MSA exceeds two, the median number. As shown in Table 13, competition has a disciplining effect on media bias. Considering the extensive margin (columns (1) and (2)), the interaction term between advertising and competition is positive and statistically significant, implying that competition reduces the direct impact of advertising spending on bias in news coverage. We find similar results (in columns (3) and (4)) when we analyze the intensive margin, with the interaction term again positive and statistically significant.[29]

These results are in line with existing findings of newspaper competition. In a historical study, Gentzkow et al. (2015) find that competitive forces in the newspaper market mitigated any impact of the party in power from exerting political influence.[30] Similarly, Galvis et al. (2016) find that partisan bias in the coverage of corruption scandals was limited by the presence of other newspapers in the market.

7.2. Craigslist and Media Bias

We next consider competition in the advertising market. As formalized in a theoretical extension, we hypothesize that increased competition in the advertising market, modeled via a reduction in the market price for classified advertising, makes newspapers more reliant on traditional advertisers, such as automobile manufacturers. This reduces the leverage of newspapers and may increase bias towards these traditional advertisers.

Empirically, we examine competition in the advertising market via the disruption of the advertising market by the introduction of the internet during our sample period (2000-2014). Websites such as Craigslist provided a platform for posting classified ads for free, reducing demand for classified advertising space in a newspapers. It was even termed the 'newspaper killer' because of its hypothesized adverse impact on advertising revenue available to newspapers.[31] Indeed, Seamans and Zhu (2013) find that the introduction of Craiglist lead to a decline in advertising revenues for local newspapers of about $5 billion between

[29] We find similar results if we look at the county in which the newspaper has its headquarters in instead of the MSA.

[30] The exceptions were the Southern states, where media and political competition was limited.

[31] See http://sfist.com/2004/12/29/craigslist_newspaper_killer.php for more.

2000 and 2007. Given this, we examine whether the entry of Craiglist and the associated negative shock to advertising revenues led newspapers to cater more to traditional advertisers and to increase their bias in the coverage of recalls.

We use a difference-in-differences setup, as in Seamans and Zhu (2014), exploiting the quasi-random geographic and temporal variation in the entry of Craiglist into various counties in the U.S. Our coefficient of interest is the interaction between advertising in the past two years and whether Craigslist was available in the county where the newspaper was headquartered in that year. Additionally, we collect information on whether a newspaper had a classifieds manager or not in the year 2000 to evaluate any heterogeneity in the impact of Craigslist across newspapers.[32] As in Seamans and Zhu (2013), one would expect newspapers with classifieds ad managers to be more 'exposed' to a negative shock to ad revenue through Craigslist entry. We restrict the sample period to 2000-2007 since Craigslist entry had taken place in most regions by 2005.[33]

The results in Table 14 indicate that the entry of Craigslist did exacerbate the problem of media bias. In particular, the coefficient on the interaction between advertising and Craigslist entry is negative and statistically significant for both the extensive (column (1)) and intensive (column (2)) margins. Quantitatively, the magnitudes of the coefficients are comparable (-0.34 when the dependent variable is the probability of writing an article in column (1)) to the baseline estimates in Table 2 (-0.277 in column (4)). Then, we split the sample into newspapers with and without a classifieds manager. In line with our hypotheses, the Craigslist impact is driven primarily by newspapers with a classifieds manager (columns (3) and (4)), while there is no effect on newspapers without a manager (columns (5) and (6)). This implies that the presence of Craigslist made those newspapers bias their coverage even more when they were more vulnerable to a negative shock, as proxied by the presence of a classifieds ad manager.

To sum up, we do find indirect, spillover effects on media bias from the introduction of Craigslist in addition to its direct effect on ad prices as documented by Seamans and Zhu (2013). More generally, this exercise captures how the availability of the internet indirectly impacted news content by providing traditional newspaper advertisers an alternative channel to reach their desired audience.

[32] This information is collected from the Editor and Publisher's International Yearbook (2000).
[33] Our results are robust to alternative cutoff years. Available upon request.

7.3. Ownership Structure and Media Bias

We have so far focused on the impact of advertising and reader preferences on newspaper coverage. An additional potential player is the owner of the newspaper. In particular, it is possible that ownership structure matters for media bias. In particular, we examine whether manufacturers influence coverage via advertising in another newspaper owned by the same company. That is, are there any spillovers in media bias across newspapers because of joint ownership?

First, we analyze whether advertising by manufacturers in a newspaper leads to any spillovers in coverage by another newspaper owned by the same company and headquartered in the same MSA. In particular, in addition to the logarithm of ad spending over the previous two years, we also look at the logarithm of advertising expenditure over the past two years by the manufacturer in any other newspaper owned by the same company in the same MSA. Columns (1) and (2) in Table15 show that there is no evidence of such spillovers. The coefficient on the log of ad spending in other newspapers in the MSA owned by the company is statistically insignificant for both the extensive (column (1)) and intensive (column (2)) margin. In columns (3) and (4), we also include a measure of advertising in newspapers in other MSAs owned by the same company. Again, we find the coefficient on both variables to be statistically insignificant, indicating an absence of spillovers in bias across newspapers owned by the same company.

These results on cross-ownership are similar to existing findings. Gentzkow and Shapiro (2010) find that the political preferences of newspaper owners do not influence the political slant of news coverage. Likewise, DellaVigna and Hermle (2016) analyze movie reviews and find no evidence of media outlets biasing their reviews in favor of companies in the same conglomerate.

7.4. The Impact of Competing Advertisers

Finally, we examine whether a newspaper provides less favorable coverage of recalls because of higher advertising by competitors of the manufacturer involved in the recall. To quantify the spillover effect, we follow the literature and include a control for past advertising expen-

diture by other manufacturers in that newspaper.[34]

The results in Table 16 indicate relationships are independent across manufacturers, with no evidence of spillovers from other advertisers. In particular, the coefficient on spending by other advertisers is statistically insignificant across all specifications (columns (1)-(4)). Overall, we find no evidence of strategic concerns in a newspaper's coverage decisions because of competitor advertising.

8. Heterogeneity of Baseline Estimates

We next analyze the heterogeneity of our baseline results across several different dimensions: the size of newspapers and manufacturers, domestic versus foreign manufacturers, and dealer versus manufacturer advertising.

8.1. Large Newspapers and Manufacturers

We begin by analyzing how our results vary with the size of the newspapers. It is important to analyze the extent of media bias on newspapers with the highest circulation since they are ones which are most likely to shape public opinion.

We create indicators for newspapers which are above the median level of daily circulation in our sample and interact this measure with ad spending. As shown in Table 17, the coefficient on the interaction term is negative across specifications and statistically significant for both the extensive and intensive margins. This result indicates that, if anything, larger newspapers are more responsive to advertising expenditure from car manufacturers.

We now turn our attention to the car manufacturers that are the largest advertisers to see if a similar result holds. We create an indicator variable which is equal to one if the car manufacturer's advertising expenditure is above the median and zero otherwise.[35] As shown in Table 17, the coefficient on the interaction between advertising and the indicator is negative and statistically significant for both the extensive margin and the intensive margin. Overall, this implies that newspapers bias their coverage the most in favor of the largest advertisers.

[34] This is the model that the advertising literature uses to capture spillover effects of advertising expenditure on product demand between different firms. That is, as in Shapiro (2016) and Sinkinson and Starc (2016), we additionally include a variable which is the sum of advertising expenditure by all other manufacturers in that newspaper over the past two years.

[35] One can use the demand for the manufacturers' cars as an alternative definition for size to find similar results.

8.2. Domestic vs. Foreign Manufacturers

Next, we analyze whether there is any difference in the way advertising expenditures are treated by newspapers depending on the country of origin of the car manufacturers. In particular, we investigate whether domestic manufacturers (Ford, General Motors and Chrysler) are favored more conditional on the amount of advertising expenditure.[36] As shown in Table 17, the results clearly indicate a systematic difference in news coverage between domestic and foreign car manufacturers for both the extensive and intensive margins. This implies that an advertising dollar buys a domestic car manufacturer more favorable coverage than a foreign one.

8.3. Dealer Dollars and Small Newspapers

One final dimension of heterogeneity involves how advertising spending differentially affects coverage depending on whether advertising is made by a local dealer or by the manufacturer directly. As motivated by our theoretical extension involving transactions costs, we hypothesize that the relationship should be strongest when small newspapers receive advertising from local dealers since the relationship should be strongest in this case and monitoring costs should be low.

Using information on the distinction between advertising by local dealers and advertising by national manufacturers, we focus on the interaction between advertising dollars coming from dealers and an indicator for small newspapers, as defined above. As shown in Table 18, we find a statistically significant difference in coverage when the dealers advertise in small newspapers. In columns (1)-(2), which report results for the extensive margin, the interaction term on dealer dollars and small newspapers is negative and significant across different specifications. The direct effect of dealer dollars is positive and insignificant in column (1) though it turns marginally significant at the 10% level in column (2).[37] The results are similar in columns (3)-(4) when analyzing the intensive margin. Taken together, these results are in line with our theoretical hypothesis that smaller newspapers provide more favorable coverage when advertising comes from local dealers.

[36] Friebel and Heinz (2014) find that, for similar firm downsizing events, German newspapers bias their coverage against foreign firms much more than for domestic firms, providing evidence in favor of xenophobia in media behavior.

[37] The overall effect of dealer dollars is still negative on the amount of coverage when looking at the combination of the direct effect and the interaction term.

9. Informative Effects of Recall-Related Coverage

Distortion of media coverage or media capture due to advertising revenue would be of particular concern, from a policy perspective, if it influenced the information and subsequent actions of readers. If readers get safety related information from newspaper coverage of recalls, then biased coverage could lead to lower levels of information and sub-optimal actions. Hence, if readers are unable to discount the bias, this would in turn lead to an underestimation of safety risks, potentially increasing the number of accidents and fatalities. In this section, we provide some evidence suggesting that lower number of recall related news articles is indeed associated with greater fatalities.

To do so, we use the FARS data, as described above, and estimate the following specification:

$$fatalities_{mst} = \alpha + \theta_1 coverage_{mst} + \theta_2 recall_{m(t-1)} + \theta_3 recall_{m(t-1)} \times coverage_{mst} + \beta_s + \phi_m + \psi_t + \varepsilon_{mst}$$

In particular, we regress the number of fatalities on the number of articles written about that manufacturer's recalls in that month accounting for whether there was a recall related to that manufacturer in the previous month. The coefficient of interest is on the interaction term between (recall-related) coverage and whether a recall related to that manufacturer was announced in the previous month. The intuition is that when a defect is identified and a recall is issued, then news coverage will provide that information to vehicle owners who can take relevant steps to prevent accidents.

The results in Table 19 highlight the social value of recall-related information in news articles. We find that the interaction term between the number of articles and whether there was a recall in the previous month is negative and statistically significant across different specifications (columns (1)-(4)). This indicates that if there is greater news coverage of a manufacturer's recall after the recall is formally announced, then it leads to lower vehicle related fatalities. This effect is robust to controlling for state fixed effects (columns (2)-(4)), manufacturer and month fixed effects (columns (3)-(4)) as well as explicitly controlling for the mean level of advertising spending in the state (column (4)).

These results suggest that news articles contain information which is utilized by car owners and higher recall related coverage can reduce road accidents and fatalities. Taken together, our findings indicate that sustained advertising spending by car manufacturers can

impact vehicle related deaths by distorting media coverage of car safety recalls.

10. Conclusion

There is significant existing evidence that media coverage has an impact on variety of outcomes, ranging from voting (e.g., DellaVigna and Kaplan, 2007) and financial decisions (e.g., Fang and Peress, 2009) to war-related deaths (e.g., Durante and Zhuravskaya, 2016). Hence, it is vital that the media provides unbiased and accurate news to its consumers so that they make better informed decisions.

Despite the perceived importance of this issue, existing studies are unable to separate advertiser bias from demand-side bias. We overcome these challenges by analyzing media bias in the context of car safety recalls, where advertisers and readers arguably have opposing preferences over coverage. We find that higher advertising spending over the previous two years leads to more favorable coverage of recalls, and the relationship is particularly strong for more severe recalls. In contrast to the existing literature, which finds evidence of a high frequency advertising-media bias relationship, we find that it is a medium-long term relationship between the advertiser and newspaper that drives the favorable coverage decisions.

We also analyze the impact of the media market structure and how it interacts with media bias. Competition between newspapers has a disciplining effect by reducing the amount of favorable coverage given to a manufacturer, when compared to newspapers operating as local monopolies. Additionally, we find that the entry of Craigslist, which arguably makes newspapers more reliant on traditional advertisers, increases bias in coverage. Moreover, in line with the literature, we do not find any effect of the ownership structure of newspapers on media bias. Highlighting the importance of relationships, we find that bias is strongest when small newspapers receive advertising from local dealers. Finally, we provide evidence that news coverage of recalls can lead to lower fatalities, suggesting an important social cost from the distortion of media coverage.

Taken together, our findings demonstrate the existence of a supply-side bias due to advertising revenue in a robust manner. The vulnerability of newspapers to influence by advertisers and the role of market structure has implications for policy makers. In particular, regulators should seek to formulate rules which limit such conflicts of interest and collusion possibly through limiting concentration of media ownership and encouraging competition

between media outlets.

REFERENCES

Beattie, Graham, "Advertising, Media Capture, and Public Opinion: The Case of Climate Change," *Working Paper*, 2017.

Besley, Timothy and Andrea Prat, "Handcuffs for the grabbing hand? Media capture and government accountability," *The American Economic Review*, 2006, *96* (3), 720–736.

Chen, Ye, Dmitry Pavlov, and John F Canny, "Large-scale behavioral targeting," in "Proceedings of the 15th ACM SIGKDD international conference on Knowledge discovery and data mining" ACM 2009, pp. 209–218.

Chiang, Chun-Fang and Brian Knight, "Media bias and influence: Evidence from newspaper endorsements," *The Review of Economic Studies*, 2011, p. rdq037.

Corneo, Giacomo, "Media capture in a democracy: The role of wealth concentration," *Journal of Public Economics*, 2006, *90* (1), 37–58.

Durante, Ruben and Brian Knight, "Partisan control, media bias, and viewer responses: Evidence from Berlusconi's Italy," *Journal of the European Economic Association*, 2012, *10* (3), 451–481.

Dyck, Alexander, Natalya Volchkova, and Luigi Zingales, "The corporate governance role of the media: Evidence from Russia," *The Journal of Finance*, 2008, *63* (3), 1093–1135.

Ellman, Matthew and Fabrizio Germano, "What do the papers sell? A model of advertising and media bias," *The Economic Journal*, 2009, *119* (537), 680–704.

Galvis, Ángela Fonseca, James M Snyder Jr, and BK Song, "Newspaper Market Structure and Behavior: Partisan Coverage of Political Scandals in the United States from 1870 to 1910," *The Journal of Politics*, 2016, *78* (2), 368–381.

Gambaro, Marco and Riccardo Puglisi, "What do ads buy? Daily coverage of listed companies on the Italian press," *European Journal of Political Economy*, 2015, *39*, 41 – 57.

Gentzkow, Matthew and Jesse M Shapiro, "What drives media slant? Evidence from US daily newspapers," *Econometrica*, 2010, *78* (1), 35–71.

_ , Nathan Petek, Jesse M Shapiro, and Michael Sinkinson, "Do Newspapers Serve the State? Incumbent Party Influence on the US Press, 1869–1928," *Journal of the European Economic Association*, 2015, *13* (1), 29–61.

Gurun, Umit G and Alexander W Butler, "Don't believe the hype: Local media slant, local advertising, and firm value," *The Journal of Finance*, 2012, *67* (2), 561–598.

Joshi, Amruta, Abraham Bagherjeiran, and Adwait Ratnaparkhi, "User demographic and behavioral targeting for content match advertising," in "Proceedings of the Fifth International Workshop on Data Mining and Audience Intelligence for Advertising (ADKDD 2011)" Association for Computing Machinery New York 2011, pp. 53–60.

Petrova, Maria, "Inequality and media capture," *Journal of public Economics*, 2008, *92* (1), 183–212.

_ , "Newspapers and parties: How advertising revenues created an independent press," *American Political Science Review*, 2011, *105* (04), 790–808.

Plunkett, John and Quinn Ben, "Telegraph's Peter Oborne resigns, saying HSBC coverage a "fraud on readers"," *The Guardian*, February 2015.

Qin, Bei, David Strömberg, and Yanhui Wu, "Media Bias in Autocracies: Evidence from China," 2014.

Reuter, Jonathan and Eric Zitzewitz, "Do ads influence editors? Advertising and bias in the financial media," *Advertising and Bias in the Financial Media (August 17, 2005). AFA*, 2005.

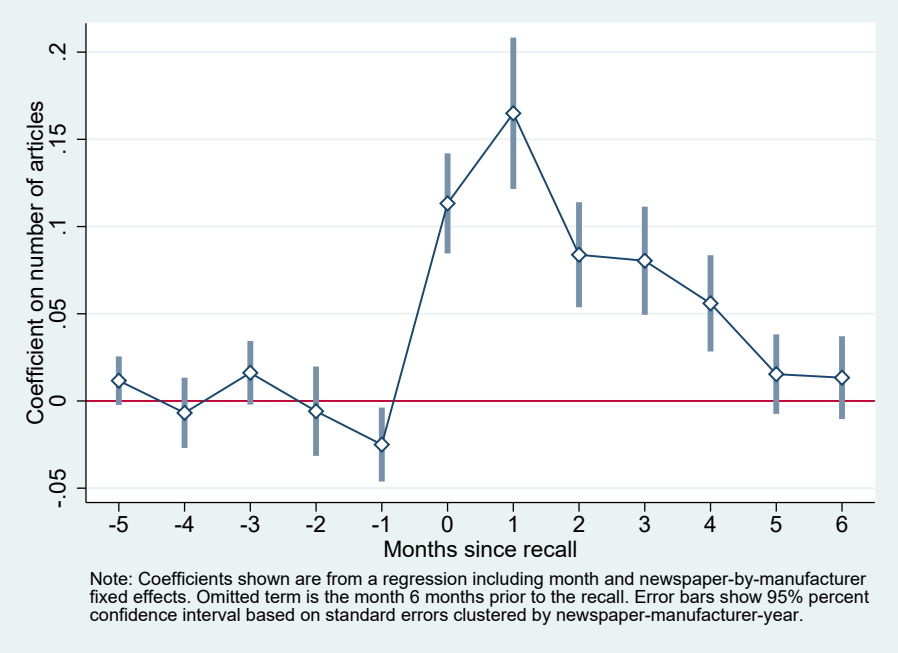
Seamans, Robert and Feng Zhu, "Responses to entry in multi-sided markets: The impact of Craigslist on local newspapers," *Management Science*, 2013, *60* (2), 476–493.

Sen, Ananya and Pinar Yildirim, "Clicks and Editorial Decisions: How Does Popularity Shape Online News Coverage?," *Available at SSRN 2619440*, 2015.

Strömberg, David and James Snyder, "Press Coverage and Political Accountability," *Journal of Political Economy*, 2010.

Tella, Rafael Di and Ignacio Franceschelli, "Government advertising and media coverage of corruption scandals," *American Economic Journal: Applied Economics*, 2011, *3* (4), 119–151.

FIGURE 1: TIMING OF ARTICLES AROUND A RECALL



Note: Coefficients shown are from a regression including month and newspaper-by-manufacturer fixed effects. Omitted term is the month 6 months prior to the recall. Error bars show 95% percent confidence interval based on standard errors clustered by newspaper-manufacturer-year.

FIGURE 2: LANGUAGE USE IN FULL TEXT ARTICLES

FIGURE 3: COEFFICIENTS ON LAGGED QUARTERLY ADVERTISING SPENDING

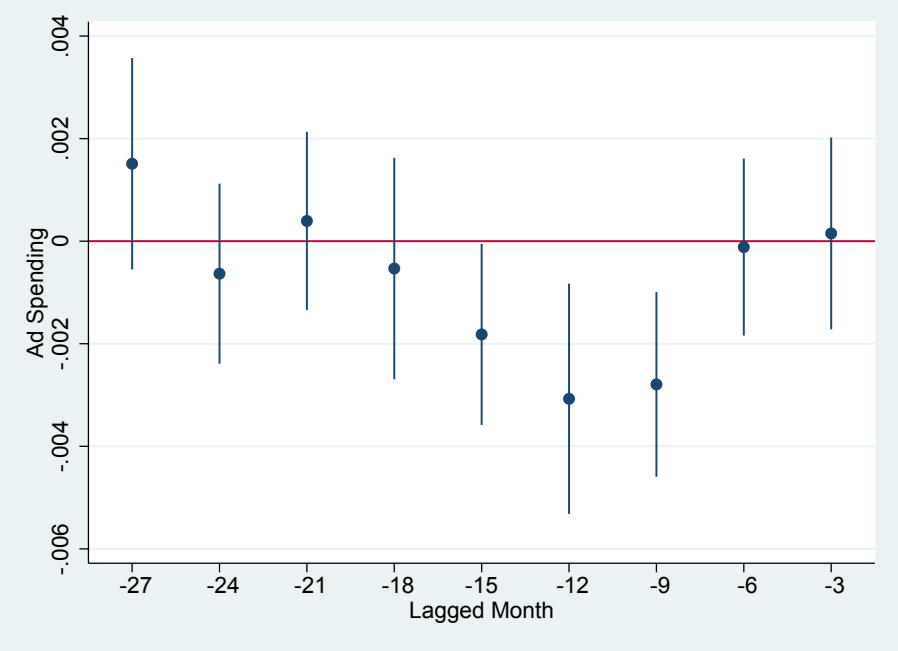


FIGURE 4: COEFFICIENTS ON MONTHLY LEADS OF ADVERTISING SPENDING

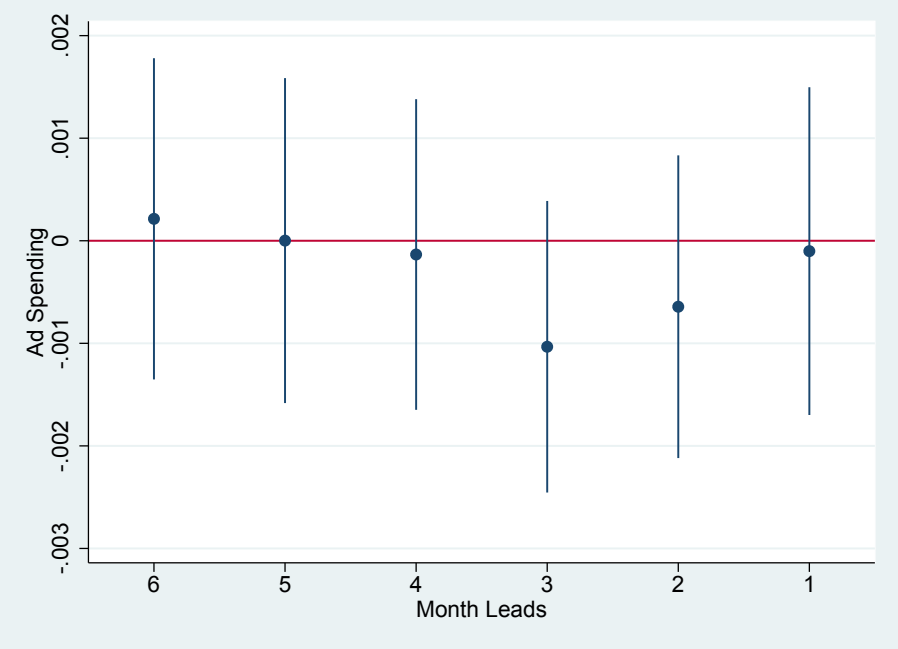
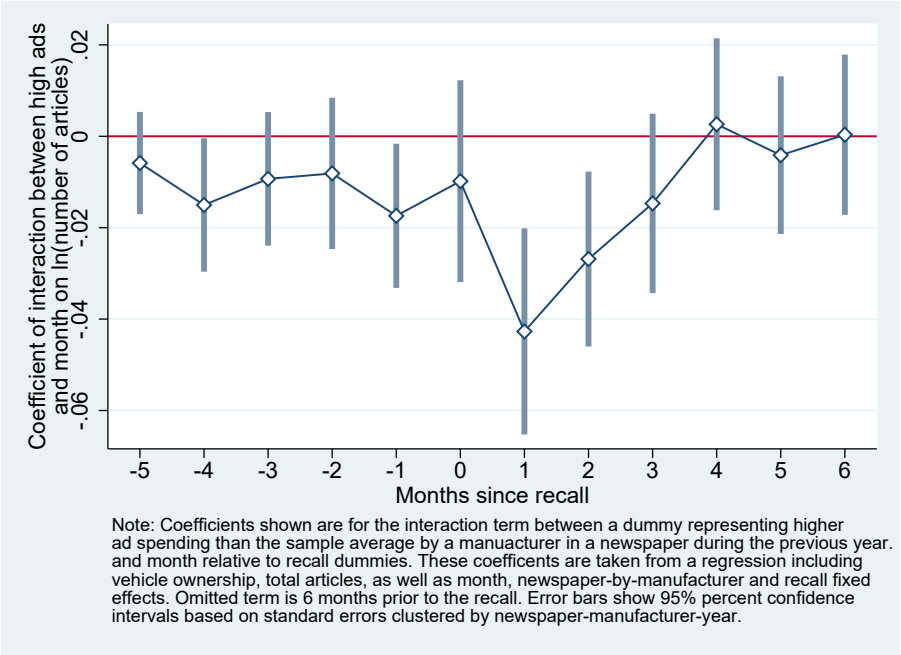
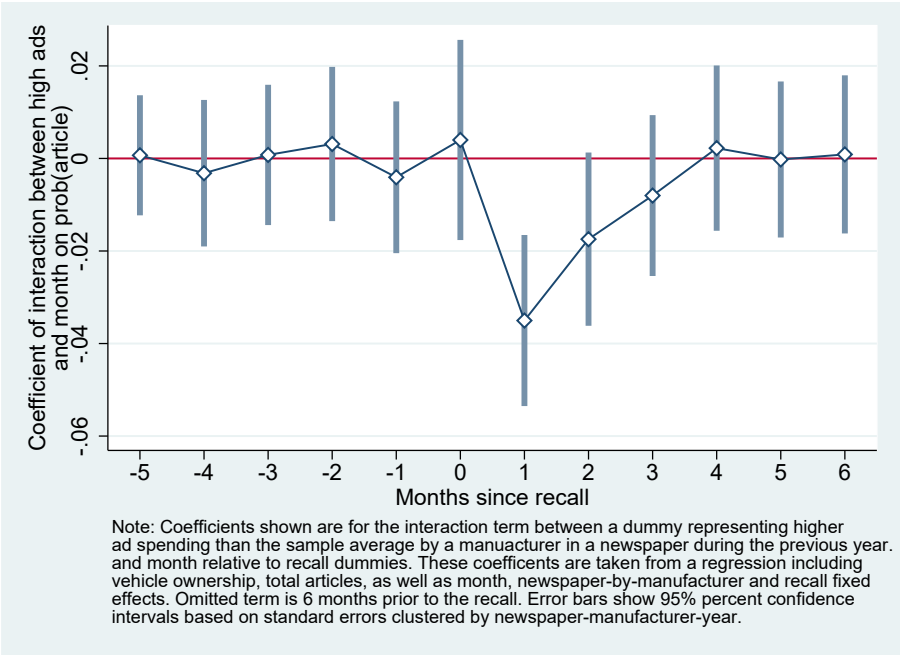


FIGURE 5: COEFFICIENTS OF HIGH ADS × MONTH SINCE RECALL ON NUMBER OF ARTICLES



Note: Coefficients shown are for the interaction term between a dummy representing higher ad spending than the sample average by a manuacturer in a newspaper during the previous year. and month relative to recall dummies. These coefficents are taken from a regression including vehicle ownership, total articles, as well as month, newspaper-by-manufacturer and recall fixed effects. Omitted term is 6 months prior to the recall. Error bars show 95% percent confidence intervals based on standard errors clustered by newspaper-manufacturer-year.

FIGURE 6: COEFFICIENTS ON HIGH ADS × MONTH SINCE RECALL ON PROBABILITY OF ARTICLE



Note: Coefficients shown are for the interaction term between a dummy representing higher ad spending than the sample average by a manuacturer in a newspaper during the previous year. and month relative to recall dummies. These coefficents are taken from a regression including vehicle ownership, total articles, as well as month, newspaper-by-manufacturer and recall fixed effects. Omitted term is 6 months prior to the recall. Error bars show 95% percent confidence intervals based on standard errors clustered by newspaper-manufacturer-year.

TABLE 1: SUMMARY STATISTICS

	Obs.	Mean	Std. Dev.	Min.	Max.
Number of Articles	160,261	0.118	0.753	0	64
Probability of an Article	160,261	0.071	0.251	0	1
Monthly Advertising ($,000)	160,261	102.3	209.7	0	7395.6
Advertising ($,000)-Past Two Years	131,332	2576.7	4749.5	0	64931.9
Number of Affected Vehicles	160,261	77866.72	415894.2	0	587771
Firm's Share Local Cars	160,261	0.081	0.072	0	0.269
Newspaper Size	160,261	283249	171793.9	99	1542951

TABLE 2: ADVERTISING SPENDING AND RECALL-RELATED COVERAGE: EXTENSIVE MARGIN

	(1) P(articles)	(2) P(articles)	(3) P(articles)	(4) P(articles)	(5) P(articles)
Log Ad Spending (previous 2 years)	0.918*** (0.127)	-0.519*** (0.117)	-0.651*** (0.113)	-0.271** (0.106)	-0.217** (0.093)
Log Affected Vehicles			0.296*** (0.019)	0.261*** (0.018)	0.261*** (0.019)
Firm's Share Local Cars			0.331*** (0.120)	0.316*** (0.117)	0.301*** (0.068)
Total Articles			0.027*** (0.005)	0.050*** (0.005)	0.049*** (0.005)
Month FE	No	No	No	Yes	Yes
Newspaper x Firm FE	No	Yes	Yes	Yes	No
Newspaper FE	No	No	No	No	Yes
Firm FE	No	No	No	No	Yes
Observations	131,332	131,332	131,332	131,332	131,332
R-squared	0.007	0.124	0.129	0.168	0.14

Robust standard errors in parentheses clustered by newspaper x firm. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer. To improve legibility, the coefficient of "Log Ad Spending (previous 2 years)", and "Log Affected Vehicles", are scaled up by a factor 10^2. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 3: ADVERTISING SPENDING AND RECALL-RELATED COVERAGE: INTENSIVE MARGIN

	(1) Log(articles)	(2) Log(articles)	(3) Log(articles)	(4) Log(articles)	(5) Log(articles)
Log Ad Spending (previous 2 years)	0.705*** (0.124)	-0.561*** (0.121)	-0.670*** (0.119)	-0.277*** (0.106)	-0.221*** (0.098)
Log Affected Vehicles			0.286*** (0.021)	0.259*** (0.206)	0.259*** (0.210)
Firm's Share Local Cars			0.335*** (0.126)	0.311** (0.120)	0.315*** (0.084)
Total Articles			0.023*** (0.005)	0.047*** (0.006)	0.047*** (0.006)
Month FE	No	No	No	Yes	Yes
Newspaper x Firm FE	No	Yes	Yes	Yes	No
Newspaper FE	No	No	No	No	Yes
Firm FE	No	No	No	No	Yes
Observations	131,332	131,332	131,332	131,332	131,332
R-squared	0.005	0.140	0.145	0.201	0.161

Robust standard errors in parentheses clustered by newspaper *x* firm. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer. To improve legibility, the coefficient of "Log Ad Spending (previous 2 years)", and "Log Affected Vehicles", are scaled up by a factor 10^2. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 4: ADVERTISING SPENDING AND SEVERITY OF RECALLS

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Log Ad Spending (previous 2 years)	-0.179*	-0.162*	-0.239**	-0.221**
	(0.102)	(0.0963)	(0.101)	(0.0930)
Log Ad Spending × Defect (previous 2 years)	-0.252***	-0.302***		
	(0.0801)	(0.0968)		
Log Ad Spending × No. Vehicles (previous 2 years)			-0.590**	-0.920**
			(0.260)	(0.385)
Controls	Yes	Yes	Yes	Yes
Controls× Severity Measure	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R-squared	0.169	0.203	0.171	0.205

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given firm (columns (1) & (3)), and the log (+1) of the number of such articles (columns (2) & (4)). To improve legibility, the coefficients on all lags of Log Ad Spending are scaled up by a factor 10^2. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually. Controls x Severity Measure includes interactions of control variables with dummies if there was a recall involving an important component such as the engine, accelerator, brakes etc. (Defect) in columns (1) and (2), and if the recall was severe in terms of the number of vehicles affected (No. Vehicles) in columns (3) and (4).

TABLE 5: PROBABILITY OF RECALL-RELATED ARTICLES AND DIFFERENT LAGS OF ADVERTISING SPENDING

	(1) P(articles)	(2) P(articles)	(3) P(articles)	(4) P(articles)	(5) P(articles)	(6) P(articles)
Log Ad Spending (previous 2 years)	-0.271**					
	(0.127)					
Log Ad Spending (previous 6 months)		-0.0582				0.140
		(0.105)				(0.101)
Log Ad Spending (6 to 12 months before)			-0.179*			-0.201*
			(0.107)			(0.107)
Log Ad Spending (1 to 2 years before)				-0.239***		-0.289***
				(0.089)		(0.098)
Log Ad Spending (2 to 3 years before)					-0.072	0.146
					(0.082)	(0.099)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper x Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	131,332	156,095	143,458	131,332	120,456	118,771
R-squared	0.168	0.176	0.171	0.168	0.170	0.170

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability of an article written by a newspaper about the recall of a manufacturer's vehicle in a particular month. To improve legibility, the coefficients on all lags of Log Ad Spending are scaled up by a factor 10^2. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 6: DIFFERENT LAGS OF AD SPENDING AND NUMBER OF RECALL-RELATED ARTICLES

	(1) Log(articles)	(2) Log(articles)	(3) Log(articles)	(4) Log(articles)	(5) Log(articles)	(6) Log(articles)
Log Ad Spending (previous 2 years)	-0.277***					
	(0.106)					
Log Ad Spending (previous 6 months)		-0.122				0.0938
		(0.135)				(0.116)
Log Ad Spending (6 to 12 months before)			-0.254*			-0.352**
			(0.131)			(0.140)
Log Ad Spending (1 to 2 years before)				-0.220**		-0.176
				(0.088)		(0.113)
Log Ad Spending (2 to 3 years before)					-0.049	0.176
					(0.097)	(0.124)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
News x Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	131,332	156,095	143,458	131,332	120,456	118,771
R-squared	0.201	0.212	0.203	0.201	0.204	0.206

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the number of articles written by a newspaper about the recall of a manufacturer's vehicle in a particular month. To improve legibility, the coefficient of Log(Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 7: SHORTER LAGS OF AD SPENDING AND COVERAGE OF RECALL-RELATED ARTICLES

	(1) P(articles)	(2) P(articles)	(3) P(articles)	(4) P(articles)	(5) P(articles)	(6) Log(articles)
Log Ad Spending in Month t-1	0.011			-0.037	-0.032	-0.011
	(0.101)			(0.0871)	(0.0899)	(0.0809)
Log Ad Spending in Month t-2		0.033		0.090	0.105	0.0766
		(0.102)		(0.0856)	(0.0904)	(0.0770)
Log Ad Spending in Month t-3			-0.005	-0.052	0.0371	-0.0288
			(0.103)	(0.0882)	(0.088)	(0.0827)
Log Ad Spending					-0.293***	-0.288***
(6 to 18 months before)					(0.0984)	(0.105)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	157,191	156,248	155,524	153,264	136,257	136,257
R-squared	0.175	0.175	0.176	0.176	0.168	0.20

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given firm (columns 1-5), and the log (+1) of the number of such articles (column 6). To improve legibility, the coefficient of Log(Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 8: STABLE ADVERTISING SPENDING AND COVERAGE

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Consistent Spending (previous 2 years)	-0.199*** (0.0661)	-0.134** (0.0640)	-0.191*** (0.0667)	-0.126* (0.0646)
Log Ad Spending (previous 2 years)			-0.278** (0.111)	-0.289*** (0.112)
Controls	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	128,803	128,803	128,803	128,803
R-squared	0.165	0.198	0.165	0.198

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given firm (columns (1) & (3)), and the log (+1) of the number of such articles (columns (2) & (4)). To improve legibility, the coefficients on all lags of Log Ad Spending are scaled up by a factor 10^2. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 9: LEADS OF AD SPENDING AND COVERAGE OF RECALL-RELATED ARTICLES

	(1) P(articles)	(2) P(articles)	(3) P(articles)	(4) Log(articles)	(5) Log(articles)	(6) Log(articles)
Log Ad Spending (previous 2 years)	-0.246** (0.100)	-0.232** (0.099)	-0.203** (0.096)	-0.216** (0.0919)	-0.182** (0.088)	-0.143* (0.0816)
Log Ad Spending in Month t+1	-0.0009 (0.0958)	0.0788 (0.0879)	0.0482 (0.0867)	-0.0712 (0.102)	0.0271 (0.0799)	0.0078 (0.0077)
Log Ad Spending in Month t+2		-0.0069 (0.0891)	-0.0313 (0.0888)		-0.055 (0.0761)	-0.0539 (0.0748)
Log Ad Spending in Month t+3		-0.113 (0.0870)	-0.130 (0.0903)		-0.099 (0.0779)	-0.0813 (0.00724)
Log Ad Spending in Month t+4			0.0132 (0.0935)			-0.0104 (0.0075)
Log Ad Spending in Month t+5			0.0868 (0.09291)			0.0010 (0.0787)
Log Ad Spending in Month t+6			-0.0401 (0.0895)			-0.0189 (0.00763)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	130,189	128,018	124,827	130,189	128,018	124,827
R-squared	0.165	0.164	0.164	0.198	0.196	0.196

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given firm (columns 1-3), and the log (+1) of the number of such articles (columns 4-6). To improve legibility, the coefficient of Log(Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 10: ROBUSTNESS CHECKS I

	(1) Top 50 recalls P(articles)	(2) Top 50 recalls Log(articles)	(3) Ad Campaign P(articles)	(4) Ad Campaign Log(articles)	(5) Ad Campaign P(articles)	(6) Ad Campaign Log(articles)	(7) TV news P(articles)	(8) TV news Log(articles)
Log Ad Spending (previous 2 years)	-0.405**	-0.382**	-0.301***	-0.285***	-0.299***	-0.284***	-0.287***	-0.300***
	(0.171)	(0.172)	(0.0993)	(0.0951)	(0.0992)	(0.0952)	(0.1064)	(0.1052)
TV news							0.113***	0.161***
							(0.0092)	(0.0134)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ad Campaign	No	No	Yes	Yes	Yes	Yes	No	No
Ad Campaign x recall month	No	No	No	No	Yes	Yes	No	No
Observations	70,096	70,096	130,909	130,909	130,909	130,909	131,332	131,332
R-squared	0.182	0.228	0.167	0.20	0.169	0.201	0.170	0.208

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the number of articles written by a newspaper about the recall of a firm's vehicle in a particular month in columns (2), (4) and (6) while it is the probability of writing an article in columns (1), (3) and (5). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually. In columns (3) and (4), we control for ad campaigns taking place 3,6 and 9 months prior to month t. In columns (5) and (6), we further control for ad campaigns within 3, 6 and 9 months of the recall first being initiated. In columns (7) and (8), we control for coverage of the recalls on TV news.

TABLE 11: ROBUSTNESS CHECKS II

	(1) Logit Dummy	(2) Neg. Bin. #articles	(3) OLS P(articles)	(4) OLS Log(articles)	(5) OLS P(articles)	(6) OLS Log(articles)	(7) OLS P(articles)	(8) OLS Log(articles)
Log Ad Spending (previous 2 years)	-0.084***	-0.078***	-0.258**	-0.264**	-0.467***	-0.340***		
	(0.0114)	(0.0114)	(0.107)	(0.108)	(0.146)	(0.128)		
Proportion of Ad Spending (previous 2 years)							-0.059**	-0.067**
							(0.028)	(0.032)
Month FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
News x Manufac FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Calendar Month FE	Yes	Yes	No	No	No	No	No	No
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls Interacted	Yes	Yes	No	No	No	No	No	No
Newspaper FE	Yes	Yes	No	No	No	No	No	No
Manufacturer FE	Yes	Yes	No	No	No	No	No	No
Observations	131,162	131,332	131,332	131,332	131,332	131,332	131,332	131,332
R-squared	-	-	0.167	0.202	0.21	0.257	0.168	0.201

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the number of articles written by a newspaper about the recall of a firm's vehicle in a particular month in columns (2), (4), (6) and (8) while it is the probability of writing an article in columns (1), (3), (5) and (7). In columns (1) and (2), there are controls interacted which means that there are interactions between all pairs of control variables: logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually. In columns (3)- (4), we use the logarithm of the total number of monthly articles published by the newspaper instead of the logarithm of the total annual articles. In (5)-(6), we allow newspaper x firm FE to vary over time. In columns (7) and (8), the independent variable of interest is the ad spending by a manufacturer as a proportion of ad spending by all manufacturers in that newspaper.

TABLE 12: ROBUSTNESS CHECKS III: WORD COUNT AS DEPENDENT VARIABLE

	(1) Log(word count)	(2) Log(word count)	(3) Log(word count)	(4) Log(word count)	(5) Log(word count)
Log Ad Spending (previous 2 years)	0.0615*** (0.008)	-0.0353*** (0.008)	-0.0441*** (0.007)	-0.0185** (0.007)	-0.0147** (0.006)
Log Affected Vehicles			0.0194*** (0.001)	0.0172*** (0.001)	0.0172*** (0.001)
Firm's Share Local Cars			2.248*** (0.820)	2.103*** (0.795)	2.135*** (0.486)
Total Articles			0.182*** (0.034)	0.331*** (0.037)	0.330*** (0.037)
Month FE	No	No	No	Yes	Yes
Newspaper x Firm FE	No	Yes	Yes	Yes	No
Newspaper FE	No	No	No	No	Yes
Firm FE	No	No	No	No	Yes
Observations	131,332	131,332	131,332	131,332	131,332
R-squared	0.007	0.128	0.133	0.175	0.146

Robust standard errors in parentheses clustered by newspaper x firm. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 13: MEDIA BIAS AND NEWSPAPER COMPETITION

	(1) P(articles)	(2) P(articles)	(3) Log(articles)	(4) Log(articles)
Log Ad Spending (previous 2 years)	-0.415*** (0.141)	-0.462*** (0.143)	-0.430*** (0.140)	-0.465*** (0.145)
Log Ad Spending x Newspaper Competition (previous 2 years)	0.501** (0.194)	0.569*** (0.193)	0.536*** (0.201)	0.579*** (0.204)
Controls	Yes	Yes	Yes	Yes
Controls x Newspaper Competition	No	Yes	No	Yes
Month FE	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R-squared	0.168	0.168	0.201	0.202

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer (columns 1 and 2), and the log (+1) of the number of such articles (columns 3 and 4). To improve legibility, the coefficient of Log(2 Year Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(2 Year Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 14: AD SPENDING, BIAS AND CRAIGSLIST

	Full Sample (1) P(articles)	Full Sample (2) Log(articles)	Cl. Ads Manager (3) P(articles)	Cl. Ads Manager (4) Log(articles)	No Cl. Ads Manager (5) P(articles)	No Cl. Ads Manager (6) Log(articles)
Log Ad Spending (Previous two years)	-0.093 (0.196)	-0.047 (0.169)	0.179 (0.220)	0.226 (0.177)	-0.458 (0.390)	-0.524 (0.345)
Log Ad Spending x Craigslist (Previous two years)	-0.345** (0.157)	-0.314** (0.135)	-0.550*** (0.178)	-0.508*** (0.150)	-0.079 (0.350)	0.045 (0.310)
Craigslist	0.012 (0.009)	0.0121 (0.008)	0.012 (0.011)	0.018** (0.009)	0.012 (0.022)	0.254 (0.019)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	55,363	55,363	39,511	39,511	15,508	15,508
R-squared	0.174	0.193	0.170	0.192	0.195	0.206

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer (columns 1,3 and 5), and the log (+1) of the number of such articles (columns 2, 4 and 6). To improve legibility, the coefficient of Log(2 Year Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(2 Year Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 15: OWNERSHIP STRUCTURE AND MEDIA BIAS

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Log Ad Spending (previous 2 years)	-0.274**	-0.279***	-0.268**	-0.266**
	(0.108)	(0.107)	(0.108)	(0.107)
Log Other Ad Spending in MSA (previous 2 years)	0.038	0.031	0.039	0.034
	(0.102)	(0.102)	(0.102)	(0.102)
Log Other Ad Spending outside MSA (previous 2 years)			-0.134	-0.303
			(0.176)	(0.210)
Controls	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R-squared	0.168	0.201	0.168	0.201

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer (columns 1 and 3), and the log (+1) of the number of such articles (columns 2 and 4). To improve legibility, the coefficient of Log(2 Year Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(2 Year Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually.

TABLE 16: AD SPENDING AND COMPETITION FROM OTHER ADVERTISERS

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Log Ad Spending (previous 2 years)	-0.529*** (0.133)	-0.646*** (0.163)	-0.237* (0.125)	-0.330** (0.149)
Log Competitors' Ad Spending (previous 2 years)	-0.021 (0.143)	0.134 (0.165)	-0.073 (0.142)	0.074 (0.164)
Controls	Yes	Yes	Yes	Yes
Month FE	No	No	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R-squared	0.131	0.148	0.168	0.202

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer (columns 1 and 3), and the log (+1) of the number of such articles (columns 2 and 4). To improve legibility, the coefficient of Log(2 Year Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(2 Year Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually. Additionally, we also control for the number of potentially affected vehicles across other manufacturers as well as the mean firm share of local car demand across all manufacturers in the media market.

TABLE 17: HETEROGENEITY OF BASELINE RESULTS

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)	(5) P(articles)	(6) Log(articles)
Log Ad Spending (previous two years)	-0.019	0.035	0.020	0.039	-0.059	-0.066
	(0.0968)	(0.093)	(0.102)	(0.0917)	(0.117)	(0.110)
Ad Spending × Large Paper (previous two years)	-0.578***	-0.702***				
	(0.229)	(0.362)				
Ad Spending × Large Manuf. (previous two years)			-0.706***	-0.750***		
			(0.218)	(0.226)		
Ad Spending × Domestic (previous two years)					-0.616***	-0.583**
					(0.242)	(0.258)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls x Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	130,884	130,884	131,332	131,332	131,332	131,332
R-squared	0.168	0.202	0.170	0.204	0.169	0.202

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer (columns 1, 3 and 5), and the log (+1) of the number of such articles (columns 2,4 and 6). To improve legibility, the coefficient of Log(2 Year Ad Spending) is scaled up by a factor 10^2 (equivalent to scaling down Log(2 Year Ad Spending) by 10^2). Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand. Controls x demand include interactions of control variables with dummies for large newspapers in columns (1) and (2), large manufacturers in columns (3) and (4) and domestic manufacturers in columns (5) and (6).

TABLE 18: DEALER DOLLARS AND SMALL NEWSPAPERS

	(1) P(articles)	(2) P(articles)	(3) Log(articles)	(4) Log(articles)
Dealer Ad Spending (previous 2 years)	0.469 (0.447)	0.767* (0.437)	0.384 (0.435)	0.747* (0.432)
Dealer Ad Spending × Small Paper (previous 2 years)	-0.973** (0.457)	-1.04** (0.448)	-0.915** (0.448)	-1.02** (0.445)
Manuf. Ad Spending (previous 2 years)	-0.284 (0.189)	-0.175 (0.174)	-0.371** (0.188)	-0.249 (0.173)
Manuf. Ad Spending × Small Paper (previous 2 years)	0.388* (0.211)	0.404** (0.201)	0.461** (0.209)	0.495** (0.203)
Controls	No	Yes	No	Yes
Month FE	No	Yes	No	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	129,950	129,950	129,950	129,950
R-squared	0.124	0.167	0.138	0.20

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable in columns (1)-(2) is the probability of an article written by a newspaper about the recall of a firm's vehicle in a particular month while it is the log (1+) of the number of articles written in columns (3)-(4). To improve legibility, the coefficients of Log(2 Year Ad Spending) are scaled up by a factor 10^2 (equivalent to scaling down Log(2 Year Ad Spending) by 10^2) .Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the logarithm of total articles written by the newspaper annually. All columns include controls for ad spending by manufacturers as well as its interaction with the size of the newspaper.

TABLE 19: RECALL-RELATED COVERAGE AND ROAD FATALITIES

VARIABLES	(1) Fatalities	(2) Fatalities	(3) Fatalities	(4) Fatalities
Total Articles	1.943***	1.518***	0.574***	0.637***
	(0.387)	(0.245)	(0.142)	(0.161)
Recall (in month t-1)	1.246***	1.338***	0.0171	0.0507
	(0.247)	(0.264)	(0.0507)	(0.0595)
Total Articles × Recall (in month t-1)	-1.503***	-1.171***	-0.363***	-0.540***
	(0.328)	(0.194)	(0.120)	(0.140)
Log(Ad Spending) (previous 2 years)				0.317**
				(0.151)
Manufacturer FE	No	No	Yes	Yes
Month FE	No	No	Yes	Yes
State FE	No	Yes	Yes	Yes
Observations	36,492	36,492	36,492	31,941
R-squared	0.056	0.241	0.545	0.542

Robust standard errors in parentheses clustered at the State level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the number of road fatalities in that state associated with a manufacturer in that month.

APPENDIX A: THEORY

INTENSIVE MARGIN EXTENSION

Given a recall, newspapers provide a certain amount of coverage q of the recall, and readers value that coverage at $v_0 - v_1(q-q^*)^2$, where q^* represents optimal reader coverage and v_1 represents the responsiveness of reader preferences to coverage. Then, overall payoffs for consumer i equal:

$$b_i + p[v_0 - v_1(q-q^*)^2] - \rho$$

Given this, market shares equal $\sigma(q)$. For newspapers, payoffs are similar to before and equal:

$$\sigma(q)(\rho - m) + a - F$$

For manufacturers, there is a per-article damage equal to d and payoffs are given by:

$$\pi - \sigma(q)pdq + e\sigma(q) - a$$

Working backwards, reader market shares equal:

$$\sigma(q) = 0.5 + \xi\left\{\mu + p[v_0 - v_1(q-q^*)^2] - \rho\right\} = \sigma(q^*) - \xi p v_1 (q-q^*)^2$$

This equals $\sigma(q^*)$ at reader-preferred levels and is declining as the number of articles is reduced from that point. In the absence of an agreement, newspapers maximize readership and thus set coverage equal to q^*. Thus, they will accept the offer from the manufacturer if the following condition holds:

$$a \geq (\rho - m)[\sigma(q^*) - \sigma(q)] = (\rho - m)\xi p v_1 (q-q^*)^2$$

The right-hand side is again the drop in subscription revenue associated with censoring. Setting this to equality, we can call $a(q)$ the required advertising equals. This equals zero in the absence of censoring ($q = q^*$) and is increasing as coverage is reduced from that point. Thus, newspapers are willing to be compensated with additional advertising for marginal suppression of information.

Taking $a(q)$ and $\sigma(q)$ as represented above, manufacturers then choose coverage levels in order to maximize:

$$\pi - \sigma(q)pdq + e\sigma(q) - a(q)$$

Assuming an interior solution in coverage, this yields the following first-order condition for advertisers:

$$\sigma(q)pd + \sigma'(q)[pdq - e] = -a'(q)$$

The first term on the left-hand side is the marginal cost of an increase in coverage in the form of a reduction

in coverage of recalls, and this is valued by the manufacturer on the margin according to $\sigma(q)pd$. The second term on the left-hand side represents the effect of an increase in market share associated with the increase in coverage. This has both costs, in the form of greater damage to the manufacturer but also benefits due to advertising reaching more readers. The right hand side represents the marginal benefit of an increase in coverage, as manufacturers can lower their advertising spending.

SEVERITY EXTENSION

Assume next that there are two types of recalls, severe and moderate. These occur with probabilities p_s and p_m, respectively. Coverage of severe recalls provide more value to readers in the sense that $v_s > v_m$. Likewise, coverage of severe recalls is associated with more damage to the reputation of the manufacturer. That is, $d_s > d_m$. We assume that newspapers now decide whether to provide coverage of all recalls, no recalls, or only moderate recalls. In this case, manufacturers choose to make one of two types of offers, a_n and a_m, where n denotes no coverage of any recalls and m denotes coverage of only moderate recalls.

Readership under the three scenarios (coverage, moderate coverage, and no coverage) equal:

$$\sigma_c = 0.5 + \xi(\mu + p_s v_s + p_m v_m - \rho)$$

$$\sigma_m = 0.5 + \xi(\mu + p_m v_m - \rho)$$

$$\sigma_n = 0.5 + \xi(\mu\text{-}\rho)$$

Then, required advertising levels are given by:

$$a_n = (\rho - m)(\sigma_c - \sigma_n) = (\rho - m)\xi(p_s v_s + p_m v_m)$$

$$a_m = (\rho - m)(\sigma_c - \sigma_m) = (\rho - m)\xi(p_s v_s)$$

In this case, manufacturer payoffs equal $\pi + e\sigma_n - a_n$ under no coverage, $\pi + e\sigma_m - a_m - p_m\sigma_m d_m$ under coverage of only moderate recalls, and $\pi - \sigma_c(p_s d_s - p_m d_m)$ in the absence of an agreement. Then, manufacturers prefer agreements to provide only moderate coverage occur under the following conditions:

$$\pi + e\sigma_m - a_m - p_m\sigma_m d_m > \pi + e\sigma_n - a_n$$

$$\pi + e\sigma_m - a_m - p_m\sigma_m d_m > \pi - \sigma_c(p_s d_s - p_m d_m)$$

One can show that this occurs when the damage from severe recalls is sufficiently high and the damage from

moderate recalls is sufficiently low:

$$d_s > \frac{-e\sigma_m + a_m + p_m\sigma_m d_m + \sigma_c p_m d_m}{\sigma_c p_s}$$

$$d_m < \frac{e\sigma_m - a_m - e\sigma_n + a_n}{\sigma_m p_m}$$

COMPETITION FOR READERS EXTENSION

There are now n newspapers and, for simplicity, assume that they are perfect substitutes. That is, readers choose between the outside option (as above) and the paper with the most coverage of recalls. If all reject the offer , then each newspaper gets a market share equal to σ_c/n. If all accept, then each newspaper gets a market share equal to σ_n/n. If one rejects and the others accept, then the rejecting newspaper receives the entire market share equal to σ_c. In a symmetric equilibrium, in which newspapers are given and accept identical offers, we have that each newspaper accepts under the following condition:

$$a \geq (\rho - m)[\sigma_c - (1/n)\sigma_n]$$

Thus, required advertising levels equal:

$$a = (\rho - m)[\xi pv + \left(\frac{n-1}{n}\right)(0.5 + \xi\mu - \xi\rho)]$$

As shown, required advertising levels for each newspaper are higher under competition ($n > 1$), relative to monopoly ($n = 1$), and are increasing in the number of newspapers (n). Thus, the returns to advertising for each paper are lower under competition.

ADVERTISING MARKET COMPETITION EXTENSION

Suppose now that the newspaper can sell advertising slots at some price θ should an agreement not be reached with the manufacturer. This can be interpreted in our context as the market price for classified advertising. Then, required advertising equals:

$$a = \theta + (\rho - m)\xi pv$$

This is decreasing as θ declines, meaning that the returns to advertising are higher when newspaper financial leverage is reduced.

TRANSACTIONS COSTS EXTENSION

Suppose now that an agreement between the newspaper and the advertiser entails a transaction cost equal to $\tau > 1$, such that manufacturers pay a but that newspapers only receive a/τ. Then, required advertising levels

are equal to:

$$a = \tau(\rho - m)\xi pv$$

Thus, required advertising is higher, and the returns to advertising are thus lower when transactions costs are high. Given this, manufacturers are willing to enter an agreement when profits are higher under no coverage (i.e., $\pi + \sigma_n e - a > \pi - p\sigma_c d$)). Substituting in, this can be written as:

$$d > \frac{\tau(\rho - m)\xi pv - e[0.5 + \xi(\mu - \rho)]}{p[0.5 + \xi(\mu + pv - \rho)]}$$

Thus, the right hand side is higher in the presence of transactions costs and agreements are thus less likely.

PRIVATE INFORMATION EXTENSION

Suppose now that the manufacturer observes whether or not a recall occurs before placing their advertisements and can withdraw their advertising in the absence of a recall. In this case, advertising is only received in the recall state of the world, and newspapers will only enter an agreement when $(\rho - m)\sigma_n - F + pa > (\rho - m)\sigma_c - F$. Given this, the required advertising equals $a = (\rho - m)\xi v$. Advertising is higher in equilibrium agreements so long as $p < 1$, and the price of censorship is thus higher, meaning that the returns to advertising are lower.

APPENDIX B: SUPPLEMENTARY TABLES

TABLE B1: CORRELATION BETWEEN ADS AND FIRM DEMAND IN THE REGION

	(1) Log Ad Spending	(2) Log Ad Spending	(3) Log Ad Spending	(4) Log Ad Spending
Firm's Share Local Cars	5.841***	5.926***		
	(1.275)	(1.268)		
Firm's Share Local Cars (One Year Previous)			6.158***	6.240***
			(1.388)	(1.383)
Controls	No	Yes	No	Yes
Month FE	Yes	Yes	Yes	Yes
News x Manufac FE	Yes	Yes	Yes	Yes
Observations	160,261	160,261	147,160	147,160
R-squared	0.645	0.646	0.645	0.646

Robust standard errors in parentheses clustered at the Newspaper-Firm level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the logarithm of ad spending by a manufacturer in a newspaper in a month. Controls include the logarithm of the number of potentially affected vehicles and the logarithm of total articles written by the newspaper annually.