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

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ABSTRACT

Do news media bias content in favor of advertisers? If so, what market conditions limit this bias? We examine the relationship between advertising by auto manufacturers in U.S. newspapers and news coverage of car safety recalls. This context allows us to separate the influence of advertisers, who prefer less coverage, from that of readers, who prefer more. Consistent with theoretical predictions, we find that newspapers provide less coverage of recalls by their advertisers, especially the more severe ones. Competition for readers from other newspapers mitigates bias, while competition for advertising by online platforms exacerbates it. Finally, we present suggestive evidence that lower coverage increases auto fatalities.

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

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1. INTRODUCTION

Mass media play a key role in informing citizens about policies and in exposing government and corporate misconduct (Strömberg and Snyder, 2010; Dyck et al., 2008). Given the influence of the press on public opinion, powerful private and political interests may have an incentive to "capture" the media to promote friendly coverage (Besley and Prat, 2006). While the literature on media capture has mainly focused on the impact of corporate ownership and government control on media freedom (Corneo, 2006; Petrova, 2008; Durante and Knight, 2012), one question that remains under-explored concerns the influence of advertisers on editorial decisions. Commercial media outlets rely heavily on advertising revenues and may prefer to under-report negative information about advertisers to avoid alienating them. Indeed, several real-world examples indicate that advertisers may change their spending decision in reaction to unfavorable coverage, and that such threat can be effective at disciplining the media.[1] Bias in favor of advertisers can be especially insidious because it is hard for readers to recognize the underlying conflict of interest and discount the bias accordingly (Chiang and Knight, 2011). Hence, understanding whether advertisers' influence can threaten media independence, and what market conditions may exacerbate this risk, is an important question with evident policy implications.[2]

From an empirical point of view identifying the causal impact of advertising spending on media bias is challenging due to the two-sided nature of media markets. 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 try to reach individuals that are more sympathetic and receptive to their message (Chen et al., 2009; Joshi et al., 2011). Profit-maximizing media can slant content either to cater to the preferences of consumers (demand-driven bias) or to the demands of advertisers (supply-driven bias). Since the two forces are inextricably linked and typically push content in the same

[1] For example, in 2005 General Motors pulled all of its advertising from the Los Angeles Times in protest for a series of negative articles about the auto maker. Another eminent example is that of British newspaper Daily Telegraph which was accused of under-reporting the tax scandals involving Swiss bank HSBC, one of its largest advertisers (Plunkett and Ben, 2015). According to Peter Oborne, former Telegraph's chief political commentator, the management had actively discouraged stories critical of HSBC since the bank suspended its advertising following a Telegraph's investigation. According to Oborne, a former Telegraph's executive defined HSBC as "the advertiser you literally cannot afford to offend".

[2] Regulators such as the Federal Communications Commission (FCC) have traditionally encouraged competition while focusing on ownership patterns, and not advertisers, to assess such supply side biases. However, recent papers by Gentzkow and Shapiro (2010) has shown that media bias might not originate from owners but from the demand side which could raise questions about the current policy paradigm.

direction, disentangling one effect from the other is difficult, and any correlation between ad spending and content can hardly be interpreted as evidence of advertisers' influence.

To overcome this challenge, we focus on a situation in which the preferences of readers and advertisers should affect content in opposite directions. Specifically, we examine the relationship between advertising by car manufacturers in U.S. newspapers and news coverage of car safety recalls. Intuitively, while car industry advertisers are likely to prefer less coverage of recalls as this may damage their reputation (Freedman et al., 2012), readers, particularly car owners, prefer more information about the safety risks associated with recalls and the ability of manufacturers to deal with them. Looking at recalls is also instructive because car defects can result in serious accidents, this case illustrates well the potential social costs of a lack of corporate accountability due to media capture. Finally, looking at U.S. media markets, and exploiting the considerable variation in market conditions, allows us to study how factors such as competitive pressure, cross-ownership, and financial distress influence pro-advertiser bias.

To test whether newspapers provide less coverage of the recalls of their advertisers, and how this depends on market conditions, we combine data from several sources. First, we collect information on all car safety recalls issued in the U.S. between 2000 and 2014; we focus in particular on the top 100 recalls in terms of the number vehicles affected,[3] which are arguably the most newsworthy. Second, we collect detailed data on the number of articles about recalls published over the same period in 115 U.S. daily newspapers, both national and local, for a total of over 13,600 articles. Third, we collect information on monthly advertising spending in these newspapers by both car manufacturers and local auto dealers. Fourth, to measure local demand for information about recalls by specific manufacturers, we use survey data on the distribution of car ownership by brand at the media market level. Finally, to proxy for the presence of online competitors, we collect information on the time of entry of *Craigslist*, the world's largest online platform for classified ads, into different U.S. newspaper markets.

Our identification strategy exploits the timing of recalls by each manufacturer relative to the timing of ad spending by that manufacturer in different newspapers. In particular, the availability of manufacturer-specific data allows us to estimate the impact of ad spending on news coverage controlling for advertiser-newspaper fixed effects and manufacturer-specific

[3] These recalls involve the nine largest manufacturers of the U.S. auto market.

local demand, and thus to separate supply-driven bias from demand-driven bias.

Using this approach, we find that newspapers provide less coverage of the recalls of manufacturers that bought more advertising from them in the previous two years. Specifically, higher advertising spending is associated with both a lower probability that the newspaper publishes any article on a manufacturer's recalls, and with a fewer number of articles when it does. Interestingly, the effect is stronger for recalls that affect a larger number of vehicles and that involve more severe defects, which are arguably more damaging for the manufacturer's reputation. Crucially, our findings also confirm the hypothesis that reader preferences influence content in the opposite direction than advertisers'. Indeed, we find that newspapers serving areas where a higher share of drivers own vehicles by a given manufacturer provide significantly *more* coverage of the recalls issued by that manufacturer.

We then explore how market structure affects newspapers' propensity to bias content in favor of advertisers. First, we find that pro-advertiser bias is less pronounced in markets with more newspapers, indicating that competition for readers, which could increase reputation concerns, has a disciplining effect on editorial choices.[4] Second, we find that newspapers that compete with online platforms for advertising dollars are more vulnerable to the pressures of advertisers, suggesting that financial hardship makes media capture by advertisers more likely. Third, we find no evidence that advertising by manufacturers in a newspaper is associated with more favorable coverage in other newspapers owned by the same company. Finally, we find that, while content on larger newspapers responds to spending by national manufacturers, smaller papers are especially responsive to spending by local dealers, a result that highlights the potential importance of personal relationships.

We also shed light on the dynamics of the relationship between advertisers and newspapers. In this regard, we find that a medium-term advertising relationship between firms and newspapers is most conducive to friendly coverage. Specifically, ad spending between six months and two years prior to the recall has the largest effect on coverage, while spending in the few months immediately before a recall and more than two years prior to it has no impact.

Finally, we provide suggestive evidence that public awareness of recalls has potentially significant social costs. In particular, we document that less coverage of the recalls of a manufacturer is associated with a higher number of fatal accidents involving vehicles

[4] We use both cross sectional variation in the number of newspapers operating in an MSA as well as identifying the effects solely from changes in competition using newspaper closures.

by that manufacturer right after the recall. This result highlights the informative value of recall-related news and the potential costs for consumers of a captured press.

Our research relates to and improves upon the few previous studies on the influence of advertisers on media editorial decisions. These include work by Di Tella and Franceschelli (2011) on the relationship between government ad spending and news coverage of corruption scandals in Argentina, by Beattie (2017) on the relationship between advertising by oil companies and news coverage of climate change, and by Gurun and Butler (2012) and Gambaro and Puglisi (2015) on the link between corporate advertising and coverage of company-related news in Germany and Italy. All these contributions face similar identification issues due to the possibility of "correlated tastes" between advertisers and readers discussed above, which our empirical strategy fully addresses. Within this stream of literature our paper also relates to previous relevant work by Reuter and Zitzewitz (2005) on the effect of advertising spending by mutual funds. Looking at three personal finance publications and two national newspapers the authors 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. Our results complement and expand on Reuter and Zitzewitz's in various ways. First, our analysis - which covers a much larger sample of publications - provides the first well-identified evidence of the presence of pro-advertiser bias in general-interest newspapers, both national and local ones. Second, our analysis documents that advertiser-driven bias applies beyond financial recommendations, and can distort consumers' information even on issues that involve serious safety risks. Third, by covering a very long sample period, our data allow us to analyze the dynamics of the relationship between advertisers and media outlets, an aspect that previous work has overlooked. Finally, and most crucially, our study is the first one to investigate in depth what market conditions can favor or deter media capture by advertisers, and to provide clear policy recommendations on how to regulate such relationship.

In this respect, our finding that capture is less likely in markets with more newspapers dovetails nicely with previous theoretical and empirical results on the the impact of competition on media bias (Gentzkow et al., 2015; Galvis et al., 2016), and suggests an additional rationale for regulation aimed at limiting concentration in media ownership. Further, the evidence that increased competition by online platforms make newspapers more vulnerable to the pressures of advertisers complements previous findings by Seamans and Zhu (2013)

that the entry of online competitors weakens newspapers' financial situation by suggesting that this may jeopardize 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.[5]

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, and Section 7 investigates timing, Section 8 describes how market structure interacts with media bias, and Section 9 analyzes some of the heterogeneity of the baseline estimates. Section 10 investigates the implications for fatalities, and Section 11 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).[6] Newspapers' reliance on advertising raises the concern that editorial decisions may be vulnerable to the influence of advertisers, especially the largest 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 publicizes 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

[5] Our result that ownership patterns do not influence media bias is in line with Gentzkow and Shapiro (2010) who find that the political preferences of newspaper owners do not influence slant, and with Dellavigna and Hermle (2017) who, looking at movie reviews, find no evidence of bias in favor of movies produced by companies in the same group.

[6] 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).

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.

Despite the fact that owners are directly notified by manufacturers via recall notices, media coverage of recalls can play an important role. There is evidence that many recall letters never reach owners of recalled vehicles.[7] In addition, even for owners who do receive the recall notice, the media may provide valuable additional information. For example, the media may report on the number of vehicles affected and other recent recalls by manufacturers, information that is not generally included in recall letters. Finally, in addition to current owners, potential buyers of both used and new vehicles may benefit from news coverage of recalls, which can provide valuable information about the quality and reliability of the vehicles and about the capacity of the manufacturer to deal with problematic situations. For all of these reasons, media coverage can increase consumers' awareness of the recalls and of the possible risks associated with them.

3. MODEL

We start by proposing a simple model in which newspapers value both readers and advertisers and must decide how to cover recalls when they occur. While readers demand more information about recalls, advertisers prefer less coverage since this can potentially hurt their reputation. While our baseline model allows for only one newspaper and one advertiser, we then extend the analysis in various ways, including consideration of competition for both readers and advertisers.

3.1. SETUP

Let p be the probability that a a product is recalled. In case of a recall, the newspaper can either report the information or suppress it. A unit mass of readers get value v from news about the recall. Let b_i, the idiosyncratic benefits from reading a newspaper (regardless of the recall), be distributed across readers uniformly over the interval $[\mu - \frac{1}{2\xi}, \mu + \frac{1}{2\xi}]$. Also,

[7] 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, and, by law, manufacturers are not required to do so. Second, owners who move without forwarding their mail will also not receive the notice. See https://www.edmunds.com/car-safety/recalled-but-unrepaired-cars-are-a-safety-risk-to-consumers.html for additional details.

let ρ be the price readers have to pay to subscribe to the paper. Hence, the expected payoff for consumer i from reading the paper is $b_i + pv - \rho$, if the recall is covered, and $b_i - \rho$, if coverage is suppressed. Readers subscribe to the paper if the expected payoff from doing so is positive. Finally, let σ_c be the paper's market share if it covers the recall, and σ_n if it does not.

The paper sells each copy at (exogenous) price ρ, and face marginal costs m and fixed costs F. As further discussed below, the papers also has the option to suppress coverage of the recall in exchange for ad spending by the manufacturer (a). Hence, the newspaper's profit equals $(\rho - m)\sigma_c - F$, if it covers the recall, and $(\rho - m)\sigma_n - F + a$, if it does not.

Turning to the manufacturer, it gets a payoff π in the absence of recall. If a recall is issued and is covered, the manufacturer's payoff is $\pi - \sigma_c d$, where d is the damage to the manufacturer's reputation associated with publicity of the recall. Finally, if a recall is issued but the paper decides not to cover it, the manufacturer's payoff is $\pi + \sigma_n e - a$, where e is the per-reader economic benefit from advertising, independent of the coverage of the recall.

The timing of the game is as follows. In the first stage, the manufacturer makes the paper a credible offer of ad spending in exchange for suppressing information about the recall. In the second the newspaper accepts or rejects the offer. In the third, and conditional on the newspaper's coverage decision, readers decide whether or not to subscribe. Finally, nature chooses whether or not a recall occurs and payoffs are realized.

3.2. EQUILIBRIUM

Working backwards, the newspaper's market share with and without coverage of the recall is, respectively:

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

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

Thus, the boost in readership from coverage is equal to $\sigma_c - \sigma_n = \xi\, pv$; this is increasing in the density of marginal readers, in the likelihood of a recall, and in the benefits to readers from learning about the recall.

The newspaper is willing to accept offers that involve a higher profit than what it can get by covering the recall. That is, the newspaper decides to suppress information about the recall if $(\rho - m)\sigma_n - F + a > (\rho - m)\sigma_c - F$. Using the results above, the minimum required

ad spending is thus:

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

This represents the drop in subscription revenue, net of production costs, associated with the loss in reputation for not covering the recall. Hence, the manufacturer is willing to strike a deal with the paper if its profit without coverage is higher than that with coverage (i.e., if$\pi + \sigma_n e - a > \pi - p\sigma_c d$). Substituting in market shares and minimum advertising levels, this can be written as:

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

Thus, media capture is more likely when the damage to the manufacturer (d) and the economic benefit of advertising (e) are larger, and when marginal costs (m) are higher, since this reduces the newspaper's profit margins. Hence, the key prediction of the model is that news coverage of the recall is lower for recalls issued by advertisers.

3.3. EXTENSIONS

We next consider six separate extensions of the model, which deliver additional predictions that we test in our empirical analysis. We briefly describe each extension below, and provide a lengthier discussion and model details in the Online Appendix.

1) Intensive margin: while our baseline model considers the decision by the newspaper over whether or not to cover a recall, we also consider the impact of ad spending on the number of recall-related articles. In this case we assume that readers have a preferred number of recalled-related articles and that their utility decreases as the number of articles declines from that ideal point. Along the same lines, we assume that the damage to the reputation of the manufacturer is increasing in the number of recall-related articles. In this case, the manufacturer offers the newspaper a certain amount of ad spending in exchange for a certain number of articles. The key prediction here is that the number of recall-related articles decreases for every dollar of ad spending.

2) Recall severity: we consider two types of recalls, moderate and severe. News coverage of severe recalls is more valuable to readers but more damaging to the manufacturer's reputation. A newspaper can decide whether to cover all recalls, no recalls, or only severe recalls. Similarly, a manufacturer can attempt to suppress coverage of all recalls or only of severe ones. In this case, the key prediction of the model is that a manufacturer will attempt

to only suppress coverage of severe recalls, under certain conditions (if the reputational damage for severe recalls is sufficiently high and the reputational damage for moderate recalls is sufficiently low).

3) Competition for readers: while in the baseline model we only consider one newspaper, in an extension we allow for multiple newspapers competing for readers. For simplicity, we assume that papers are perfect substitutes; that is, if all papers suppress coverage of the recall, they split the market share under no coverage (σ_n) in an equal way. However, if only one newspaper rejects the manufacturer's offers and covers the recall, it captures the entire market share under coverage (σ_c). This implies that suppressing coverage of the recall becomes more costly for the manufacturer as it needs to compensate each paper for the foregone monopoly profit. Hence, the key prediction is that capture should be less likely in markets with a larger number of newspapers.

4) Competition in the advertising market: if a newspaper declines the manufacturer's offer for suppressing information about the recall, it can sell the associated advertising slot at some price, which can be interpreted as the market price for classified advertising. As this price falls, the newspaper has less leverage with the manufacturer and a greater incentive to accept lower offers to suppress information. Hence, the model predicts that advertisers are more likely to capture media outlets in markets with falling advertising prices due, for example, to increased competition from online platforms for classified ads.

5) Transaction costs: transfers from a manufacturer to a newspaper aimed at suppressing information about the recall may incur a transaction cost. This cost reflects the difficulty of enforcing the non-contractual *quid pro quo* relationship between the paper and the manufacturer due to, for example, a lack of trust between the two agents. The model predicts that the lower the transaction cost, the less costly for the manufacturer to capture the paper, and the more likely that information will be suppressed, in equilibrium. Empirically, we proxy for transaction costs using personal relationships between advertisers and newspapers which, we hypothesize, are more likely between local car dealers and small papers, relative to national manufacturers and larger papers.

6) Manufacturer private information: if the manufacturer knows whether or not a recall is forthcoming, it will only advertise when there is potential coverage to suppress. Expecting to receive no advertising if a recall is not forthcoming, the newspaper will demand higher ad spending for suppressing information. Hence, the model predicts that, in the

presence of private information, capture and information suppression are less likely to occur.

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, iii) vehicle ownership by manufacturer and media market, and iv) fatalities from vehicle crashes by manufacturer and media market.

4.1. CAR SAFETY RECALL DATA

Comprehensive data on all car safety recalls issued in the U.S. 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 part(s) affected by the recall, and on the number of vehicles potentially affected. Overall, we consider more than 1800 recalls involving nine car manufacturers, accounting for over 87 percent of the market share as of 2015, [8] but in our main specifications we focus on manufacturers involved in the top 100 recalls during our 15-year sample period in terms of the number of potentially affected vehicles.[9] Since major recalls often concern multiple models, we aggregate and analyze the data at the manufacturer level.[10]

4.2. NEWS COVERAGE DATA

Data on news coverage of recalls in U.S. 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, attempting 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 or any associated brand, such as 'Chevrolet' for General Motors.[11] Recall-related articles are then assigned to a manufacturer, or multiple manufacturers, based on whether

[8] These include Chrysler, Ford, General Motors, Honda, Hyundai, Kia, Nissan, Toyota and Volkswagen. See https://www.statista.com/statistics/249375/us-market-share-of-selected-automobile-manufacturers/ for more details.

[9] Each of the top 100 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] 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.

the name of the manufacturer (or of any associated brand) is mentioned in the article.[12] 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 U.S. newspapers for a total of 13,600 recall-related articles.

As shown in Table A1, 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.

These articles often provide critical coverage of manufacturers, and almost never provide positive coverage. Figure 1 provides a visual representation of the language in articles of five newspapers in our sample.[13] As shown, there is significant representation of words with negative tone, such as as "problem", "switch", "deaths", and there is little evidence of words indicating a positive tone.

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 newspaper for each product.[14] For our analysis, 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 A1, the average monthly advertising expenditure per newspaper by a manufacturer is $102,300.

[12] 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.

[13] These include USA Today, Tampa Bay Times (formerly St. Petersburg Times), St. Louis Post-Dispatch, Pittsburgh Post-Gazette, and Atlanta Journal Constitution. In addition, we also read a random sample of recall-related articles from these same newspapers. 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 be considered negative news for the manufacturer, particularly 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.

[14] 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.

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

4.4. Vehicle Ownership Information

To measure the demand for news about the recalls of different manufacturer, we collect information on the distribution of owned vehicles by manufacturer at the local level 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; specifically, we assign each newspaper the shares of vehicles by manufacturer in the MSA where the newspaper's headquarters is located. Since the NHTS survey was only conducted in 2001 and 2009, data for the other years are imputed via interpolation. As shown in Table A1, the mean market share for a car manufacturer is 8 percent, with a maximum of about 27 percent.

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. These data are 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 the location of where the vehicle is registered. We aggregate these data to the state-manufacturer-month level during our sample period 2000-2014.

5. Empirical Strategy

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 unit of observation in our empirical analysis is newspaper-month-manufacturer. The key outcome $coverage_{mnt}$ is measured in two ways. First, we consider the extensive margin – whether or not the newspaper publishes any articles about recalls by a manufacturer in a given month. Second, we consider the intensive margin (the natural log of the number of recall related articles).[16] $advertising_{mn(t-i)}$ represents the amount of advertising spending by manufacturer m on newspaper n at time $t-i$; for example, if i is 12 the summation term

[16] Our results are robust to alternate functional forms such as the inverse hyperbolic sine transformation which also accounts for zeroes in the dependent variable. Results available upon request.

captures total ad spending by manufacturer m on newspaper n in the previous year. 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 then later investigate the dynamics of the relationship in more detail. $demand_{mny}$ represents the number of vehicles made by manufacturer m as a share of total vehicles in the MSA where newspaper n operates in year y. We expect this time-varying measure of manufacturer demand to be positively related to recall-related coverage since car owners would arguably seek out information on recall involving their vehicle's manufacturer. $severity_{mt}$ represents the number of total vehicles potentially affected by the recall(s) of manufacturer m at time t. Due to reader demand, we expect coverage to increase in this measure of recall severity. Finally, we also control for newspaper size by including a measure of the total number of articles published by the newspaper in a year.

Our specification also includes a set of fixed effects. ψ_t represents aggregate time effects, which capture any other time-specific factors that may affect coverage and/or advertising spending (e.g., seasonality). We also include ϕ_{mn} which represents manufacturer-newspaper fixed effects, which not only captures time invariant characteristics of the manufacturer-newspaper relationship, but also time invariant demand for the manufacturer's brand in that particular geographical market, which plays an important role in our identification strategy. 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]

6. Baseline Results

In Table 1 we examine the relationship between advertising spending and news coverage of recalls along the extensive margin using as dependent variable a dummy for whether a newspaper published any articles about the recall(s) issued by a given manufacturer. In column (1) we regress this variable on total advertising spending (in logs) by that manufacturer in the previous two years, without including any fixed effects or controls. The positive and

[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 A3.

significant coefficient on prior spending suggests the possibility of a spurious relationship between advertising and news coverage when demand-side factors are not controlled for. Indeed, in column (2), when newspaper-manufacturer fixed effects are included, the coefficient of interest becomes negative and highly statistically significant (at the 1% level), indicating a negative effect of advertising spending on the probability that a newspaper would talk at all about the recall(s) of a manufacturer. This confirms that controlling for time invariant demand factors in a given market is crucial to correctly estimate the effect of ad spending on coverage. [18] In column (3) we include as additional controls: i) a time-varying measure of the local demand for the manufacturer's vehicles, ii) the number of affected vehicles, and iii) the total number of articles published in the newspaper in that month. When doing so, we find that the coefficient of interest increases in size and remains highly statistically significant, which is consistent with these variables being positively correlated with the coverage of recalls and depressing the coefficient of interest when omitted. In column (4) we show that our results are also robust to the inclusion of month fixed effects.[19] In terms of magnitudes, we find that doubling advertising spending reduces the probability of coverage by 0.2 to 0.7 percentage points, between 3 and 10 percent of the baseline probability of coverage of 7 percent. Finally, in column (5), we we control separately for newspaper and manufacturer fixed effects and again find a negative and significant coefficient though somewhat smaller in magnitude than in column (4). This finding indicate that our baseline result does not depend on the inclusion of newspaper-manufacturer fixed effects, but that the latter do capture something substantive about the relationship between manufacturers and media outlets and about the underlying demand factors of each media market.[20]

[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. The results show that monthly advertising expenditure is positively correlated with contemporaneous and lagged demand 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. Results available upon request.

[19] The decline in the size of the coefficient would be primarily driven by seasonality in advertising expenditure by car manufacturers. Such seasonality is well documented in Beattie (2017) which uses a similar dataset on advertising in newspapers by car manufacturers.

[20] As a robustness exercise, we find that our main effect remains significant (at the 10% level) when we control for newspaper-month and manufacturer fixed effects separately. We also find that our results are qualitatively and quantitatively similar if we normalize the number of articles written by a newspaper on a manufacturer's recall by the total number of articles written about the same event across all newspapers in our sample. These results available upon request.

We then turn to the effect of ad spending on the intensive margin of news coverage. To this end, in Table 2 we replicate the analysis using as dependent variable the total number of recall articles published by a newspaper in a given month. In line with the prediction of the extension of our model, we find that higher advertising spending by a manufacturer is associated with fewer articles about the recalls of that manufacturer. As for the extensive margin, the effect is statistically significant and robust to controlling for newspaper x manufacturer fixed effects (columns (2)-(4)), for manufacturers' local demand (columns (3) and (4)), for the number of vehicles affected by the recall(s)(columns (3) and (4)), and for month fixed effects (column (4)). Again, the results are similar though somewhat smaller in magnitude, when controlling separately for newspaper and manufacturer fixed effects (column (5).

We then test the prediction of our model regarding the relationship between pro-advertiser bias and the severity of recalls. To this end, we create two measures of recall severity. First, we construct a measure of the seriousness of each recall, based on whether the defect(s) that motivated the recall concerned vital components such as the engine, the accelerator, the brakes, the airbags, the steering, the electrical system, the fuel system or the powertrain.[21] Second, we construct a measure of the importance of the recall based on whether it affected a number of vehicles above the median of the top one hundred recalls. As shown in Table 3, the interaction between advertising spending and seriousnes of the recall is negative and statistically significant, both for the extensive and the intensive margin (column (1) and (2) respectively). A similar result applied to recalls that affected a large number of vehicles, for boththe extensive and intensive margin (columns (3) and (4), respectively). Interestingly, the interaction term between local brand-specific ownership and eiether measure of the severity of recalls displays a positive and significant coefficient, consistent with local readers demanding more information for recalls involving more serious safety risks. These results highlight that recalls receiving less coverage due to advertising influence are those that are more relevant for consumer safety, suggesting important implications for the social cost of media capture. These findings suggest that, due to advertisers' influence, newspapers may provide inadequate coverage of those recalls that are potentially more relevant

[21] 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, Behicle Manual, 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.

for consumers' safety and for which information would be most valuable, highlighting the potentially large social cost of media capture.

As a first robustness check, we also develop recall-specific measures of news coverage for recalls with more than 1 million affected vehicles.[22] For each recall, we added to our baseline search terms (i.e. recall and manufacturer) words relevant to the recall, such as "air bag" or "fire" and focus on coverage within 6 months of the recall. Our first finding is that the timing of articles is strongly correlated with recall events. In particular, Figure 2, documents that coverage spikes during and immediately after a recall and lasts up to 4 months. We then test whether coverage of these recalls is different if advertising in the previous two years was higher than the average amount a newspaper receives from the manufacturer of the recalled vehicle. As shown in Figure 3, newspapers are less likely to cover recalls when they have recently received more advertising than usual from a manufacturer.[23] These effects are strongest during the month immediately after the month the recall is issued, with coverage returning to normal shortly after.[24] Taken together, this evidence indicate that our baseline results apply to news coverage of specific recalls.

Finally, we consider a large number of additional robustness checks, with details and results provided in the Online Appendix. In particular, the robustness checks include the following specifications: 1) consideration of the manufacturers in the top 50, rather than the top 100, recalls, 2) inclusion of controls for advertising campaigns, 3) inclusion of controls for television coverage of recalls, 4) non-linear specifications (negative binomial and logit models), 5) alternative time windows for the measure of newspaper size, 6) allowing newspaper by manufacturer fixed effects to vary over four-year intervals, 7) measuring advertising as the proportion of total advertising in that newspaper by all car manufacturers, 8) using measures of word counts, rather than the number of articles as measure of news coverage, and 9) controls for and consideration of advertising by competing manufacturers.

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

[23] In the Online Appendix we present corresponding results for the intensive margin.

[24] 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.

7. Market Structure, Advertising Revenue and Bias

We next analyze how market conditions influence the propensity of media outlets to slant content in favor of advertisers. We first investigate the effect of competition between newspapers for readers. We then look at the impact of competition for advertising by online platforms. Finally, we study how newspaper ownership structure influences editorial decisions.[25]

7.1. Newspaper Competition and Media Bias

We first consider the role of competition between newspapers. As formalized in one of the extensions to our model, competition between newspapers can limit pro-advertiser bias due to newspapers' concern of loosing reputation and readers if their under-reporting of recalls is unveiled. While our simple model predicts that reputation concerns will limit bias, it is possible that the presence of other newspapers in the market could reinforce advertisers' position by making their threat of shifting advertising spending elsewhere in response to hostile coverage more credible. Whether the effect of competition on pro-advertiser bias is positive or negative is ultimately an empirical question that our analysis attempts to elucidate.

To test this hypothesis, we define whether a newspaper faces competition. We create a time invariant measure by counting the total number of active newspapers in our sample headquartered in each MSA. A newspaper is then defined as facing competition if the total number of newspapers in the MSA exceeds the median number. . In Table 4 we estimate our baseline specification augmented by the interaction between prior advertising spending and the measure of competition. Both for the extensive and intensive margin, and regardless of what measure of competition is used, the interaction term displays a positive and significant coefficient. This suggests that the presence of competing news outlets reduces newspapers' tendency to favor advertisers.

The above result is based on using cross sectional variation across MSAs in the number of active newspapers. This can lead some confounds associated with underlying market characteristics to drive the finding of competition limiting bias.[26] To assess the robustness of

[25] We also examine the possibility that a newspaper's coverage of a manufacturer's recalls may depend on the prior advertising spending by competing manufacturers. Overall, we find no evidence of such strategic considerations on the part of newspapers. See Appendix D for details.

[26] We carry out other checks which control for other (time invariant) market level characteristics to find similar results. These are available upon request.

this result, we use a different source of variation. In particular, we use the timing of closures of newspapers across different MSAs during our sample period. Hence, we identify the effect of advertising dollars on coverage purely off changes to the market competition within MSAs. We create a list of such newspaper exits based on data made available by the Library of Congress.[27] To be consistent with the above results, we should expect that a reduction in competition should increase biased coverage since the reputation effects become less of a threat. The unit of analysis is the MSA-month.

The results in Table 5 show that the findings are consistent with those using cross sectional variation only. In particular, we find that MSAs which see a newspaper closure (After Exit) tend to bias their coverage more especially if they get higher advertising revenue from the manufacturers both for the probability of writing an article (columns 1-3) as well as the number of articles (columns 4-6). The results are robust to controlling for month fixed effects (columns 2, 3, 5 and 6) as well the entry of *Craigslist* into the MSA.[28] We additionally control for the number of active newspapers in our sample (interacted with After Exit) in all our regressions to account for any baseline heterogeneity across different MSAs along those dimensions.

This finding is in line with previous evidence on the disciplining effect of competition on partisan bias in a historical setting. For example, in a historical study on U.S. newspapers, Gentzkow et al. (2015) find that higher competition in the newspaper market mitigated the influence of the ruling party on news coverage.[29] Similarly, Galvis et al. (2016) find that partisan bias in the coverage of corruption scandals is reduced by the presence of other newspapers in the market.

7.2. Craigslist and Media Bias

We then consider the impact of competition in the advertising market. In line with our 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, and hence more vulnerable to their demands with regard to news coverage of recalls. To test this prediction

[27] See some of the information summarized on the Wikipedia page https://en.wikipedia.org/wiki/List_of_defunct_newspapers_of_the_United_States.

[28] As the next section illustrates, *Craigslist* had a significant effect on advertiser-newspaper relationships.

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

empirically, we exploit the staggered introduction across U.S. media market of *Craigslist*, the world's largest online platform for classified ads, between 2000 and 2014. The advent of *Craigslist*, and other similar platforms, provided consumers with a free and efficient alternative to post classified ads, rapidly disrupting a lucrative market that had been previously dominated by local newspapers. Indeed, as documented by Seamans and Zhu (2013) , the entry of *Craigslist* was associated with a decline in advertising revenues for local newspapers in order of $5 billion between 2000 and 2007. Our goal is to understand whether the negative revenue shock that followed the entry of *Craigslist* made newspapers more dependent on traditional advertisers and willing to accommodate content to their preferences. To this end, we employ a difference-in-differences approach similar to that used by Seamans and Zhu (2013), which exploits differences in the timing of entry of *Craiglist* across media markets where newspapers operate, as well as differences between newspapers in the same market in prior reliance on classified ads. Specifically, we examine whether: i) the impact of prior advertising spending on coverage of recalls becomes larger after a local *Craigslist* website is introduced, and ii) such increase is more pronounced for newspapers that, prior to the entry of *Craigslist*, had one or more classified ads managers[30]. Indeed, the presence of personnel specifically devoted to the management of classified ads is arguably a good proxy for the centrality of such ads in the paper financing model, and indirectly, for the potential impact of competition by *Craigslist* on the paper's revenues. We restrict the analysis to the period between 2000 and 2007 since in most regions the entry *Craigslist* had already taken place by 2005.[31] As reported in Table 6, both for the extensive and intensive margin, the coefficient on the interaction between prior ad spending and the post-*Craigslist* dummy is negative and statistically significant (columns (1) and (2)). This result supports our theoretical prediction that, when faced with competition from online platforms, newspapers became more concerned about alienating advertisers and more prone to slant content in their favor. Interestingly, and in line with intuition, this effect is more pronounced for newspapers that relied more heavily on classified ads and that had more to lose from the entry of *Craigslist* (columns (3) and (4)), while no significant effect holds for the other for the others (columns

[30] Information on the presence and number of classified ads managers in 2000 is available from the Editor and Publisher's International Newspaper Yearbook (2000).

[31] Our results are robust to alternative cutoff years. Available upon request.

(5) and (6)).[32] To sum up, we find that, the advent of online platforms, and the subsequent deterioration of the financial situation of many newspapers, contributed to weaken media editorial independence and resulted in a greater ability of advertisers to deter hostile content.

7.3. Ownership Structure and Media Bias

We then investigate the role of cross-ownership in mediating the relationship between advertisers and the media. Specifically, we explore whether advertising spending by car manufacturers in one newspaper has an impact on news coverage of recalls of other newspapers controlled by the same owner. In the first two columns of Table 7 we start by looking at newspapers owned by the same company and operating in the same media market, as proxied by the location of their headquarters. Specifically, we regress both measures of news coverage of the recalls of a manufacturer on prior spending in the same paper, and prior spending in the other papers by the same owner based in the same MSA. While spending in the same paper displays the usual negative and significant coefficient, we find no evidence that spending in sister outlets has any effect on the coverage of recalls, both on the extensive and on the intensive margin (column 1 and 2, respectively). In the remaining columns, we replicate the exercise but considering ad spending by the same manufacturer in all the other newspapers of the same owner operating both in the same and in other markets. Consistent with the previous result, ad spending in sister outlets both in the same MSA and elsewhere display statistically insignificant coefficients, confirming the lack of spillovers in pro-advertiser bias within publishing groups. These results suggest that the lack of unified strategy by media conglomerates favors advertisers. Though specific to the issue of pro-advertiser bias, they are in line with previous findings downplaying the importance of cross-ownership on partisan bias. For example, Gentzkow and Shapiro (2010) find that, once demand side factors are accounted for, newspapers by the same owner do not display similar ideological bias in news coverage of political issues. Similarly, looking at movie reviews, DellaVigna and Hermle (2016) find no evidence that media outlets provide more favorable coverage of movies produced by companies in the same group.

[32] The direct effect of advertising is insignificant due to the lack of time series variation as most *Craigslist* entry in cities happens by 2005. Since the advertising spending variable is lagged two years, it is probable that this lack of variation explains the insignificance of the main effect.

8. TIMING

While in our baseline analysis we focus on advertising spending in the previous two years, we are interested in further understanding the timing of the relationship between ad spending and coverage. In Figure 4, we plot the coefficients from a regression of the number of recall-related articles in a newspaper on quarterly ad spending by a manufacturer in the same paper over the previous 2-3 years (conditional on newspaper-manufacturer and calendar month fixed effects). Two important patterns emerge. First, advertising spending in the quarters right before a recall and several years prior to it has virtually no effect on a newspaper's decision of how extensively to cover the recall. Second, news coverage of recalls appears to be mostly influenced by advertising spending in the 3 to 5 quarters before.

To corroborate this evidence, in Table 8 we re-estimate our baseline specification including, separately and then simultaneously, different lags of ad spending. While spending in the six months prior to a recall displays a very small and insignificant coefficient (column 1), the effect is larger and significant for spending in the six to twelve months before and, especially, for spending in the one to two years before (columns 2 and 3, respectively). Advertising spending in the two to three years before also has no significant effect on coverage (column 4). We obtain similar results in column 5 where we include all lags together. Finally, in column 6 we replicate the analysis for the intensive margin; we find analogous results though, in this case, the coefficient on spending in the 6 to 12 months is the largest and most significant. Taken together, these results suggest that forging a solid medium-to-long term advertising relationship with the media can be an effective way for manufacturers to limit coverage of events that can damage their reputation.

To confirm the lack of impact of ad spending in the months right before recalls, in Table 9 we include ad spending at t-1, t-2, and t-3, respectively. The results indicate that such short term lags have no effect on coverage both when included separately (columns 1 through 3), and all at once (column 4). Furthermore, controlling for short-terms lags does not affect the magnitude and significance of the coefficient on medium-term lags (i.e., 6 to 18 months before), both for the extensive and intensive margin (columns 5 and 6, respectively). One possible explanation of this result is that newspapers may consider ad spending right before a recall as part of a manufacturer's damage-control PR operation for the upcoming recall, and, as such, not particularly informative of the long-term value of a durable relationship with the manufacturer. This intuition is captured by the extension of our theoretical model with

private information, which predicts that ad spending is less effective when manufacturers know about upcoming recalls, which seems more plausible shortly before a recall is issued than much earlier on. This type of asymmetry of information, and the consequent adverse selection problem, would be similar to that present in insurance markets and which insurers solve by imposing waiting periods. While our model is static, one could envision a dynamic setting where newspapers adopt similar strategies by not rewarding recent advertising with favorable coverage.

In addition to the amount spent in the two years prior to a recall, another measure of the solidity of the relationship between a newspaper and a manufacturer is how regularly the latter advertised in the newspaper over this period. To test whether a more stable stream of revenues leads to more favorable coverage, in Table 10 we regress coverage on a dummy for whether the manufacturer's spending has been above the median for each of the twenty-four previous months. The results of the first two columns indicate that stable spending is associated with lower coverage of recalls both for the extensive and the intensive margin. Interestingly, this result survives even when we control for total ad spending over the same period (columns 3 and 4). This suggests that newspapers value both the stability and the size of advertising spending and reward both with friendly coverage.

Finally, we test whether manufacturers punish (reward) newspapers *ex post* for more (less) negative coverage of their recalls, above and beyond their existing relationship. The results, presented in the Online Appendix, provide no evidence that manufacturers respond to the negative coverage on average. This result maps back into our model, where advertisers move first by allocating their expenditure across outlets in return for an 'acceptable' (equilibrium) level of recall related coverage.

9. Heterogeneity of Baseline Estimates

We next examine the heterogeneity of our results along various dimensions: i) the size of both newspapers and advertisers, ii) domestic vs. foreign manufacturers, and ii) dealer vs. manufacturer spending.

We first look at whether larger newspapers are more or less likely to bias content in favor of advertisers than smaller ones. This is a crucial question since newspapers with higher circulation have arguably a larger influence on public opinion. To evaluate this aspect, we construct an indicator for whether a newspaper has a circulation above the median of our

sample, and include, in our baseline specification, the interaction of this measure with prior ad spending. As shown in the first two columns of Table 11, the coefficient on the interaction term is negative and highly statistically significant for both the extensive and the intensive margins, which indicates that high-circulation papers are, if anything, more likely to bias content in favor of car manufacturers. These newspapers may be more likely to be closely monitored by advertisers to ensure that their advertising spending is rewarded. This is in contrast with Reuter and Zitzewitz who do not find large newspapers biasing their coverage in favor of their advertisers.

We then test whether larger advertisers are more effective at influencing content than smaller ones. To this end, we create a dummy for whether a manufacturer's ad spending is above the median over our sample period. As shown in columns 3 and 4 of Table 11, regardless of what measure of coverage we use, the interaction between prior ad spending and the dummy for large advertiser displays a negative and significant coefficient.[33] In terms of magnitude, for an average newspaper a one standard deviation increase in ad spending by a large advertiser in the prior two years reduces the number of recall-related articles by 24%. Overall, this implies that newspapers bias their coverage the most in favor of the largest advertisers. This evidence supports the view that newspapers are more concerned about alienating big spenders, and hence more prone to slant content in their favor.

In the last two columns of Table 11 we investigate whether newspapers are more responsive to ad spending by domestic manufacturers (i.e., Ford, General Motors and Chrysler) than by foreign ones. This could be due, for example, to the existence of closer personal and business relationships between the top management of the U.S. auto industry and U.S. media, particularly the largest ones.[34] In line with this hypothesis, our results indicate that, conditional on total advertising, a dollar spent by domestic auto-makers is associated with significantly less coverage of safety recalls than a dollar spent by foreign manufacturers, both for the extensive and intensive margin.

While we find that on average the impact of advertising is driven primarily by large newspapers, we further examine whether advertising spending by national manufacturers and by local car dealers has a similar impact on news coverage of recalls, and what categories of

[33] We get similar results when using the demand for the manufacturer' vehicles as an alternative measure of size.

[34] On a related note, Friebel and Heinz (2014)find that German newspapers tend to cover more extensively firm downsizing events by foreign companies than similar ones by German companies, providing strong evidence of home bias in the reporting of economic news.

newspapers may be more responsive to one or the other. In line with our model extension with transactions costs, we hypothesize that spending by local car dealers should be more effective at influencing local newspapers since, in this case, transaction and monitoring costs are likely to be lower also due to the existence of personal relationships between the two.

To test this hypothesis, we distinguish between ad spending by local dealers and by national manufacturers, and augment our baseline specification including an interaction term between ad spending by local dealers and small newspapers, defined as those with below-median circulation in our sample. As shown in the first two columns of Table 12, the coefficient on the interaction term is negative and statistically significant, which indicates that spending by local dealers reduces the probability that small papers cover recalls more than equivalent spending by national manufacturers. In contrast, spending by national manufacturers has a larger effect on the probability of coverage by large newspapers. [35] We find very similar results for the intensive margin (columns (3) and (4)). Taken together, these results points at a more nuanced picture with the potential role of personal relationships in facilitating the *quid pro quo* relationship between newspapers and advertisers particularly at the local level.

10. Informative Effects of Recall-Related Coverage

From a policy perspective, a reduction in news coverage of recalls due to media capture by advertisers would be especially concerning if it hindered consumers' ability to react to recalls and minimize their undesirable consequences. For example, if newspapers provide readers with useful information about the safety issues associated with recalls and about the appropriate actions to take to address them, capture, and the resulting under-reporting of recall-related news, would lead to suboptimal levels of awareness and a higher risk of accidents and fatalities.

In this section, we test whether less news coverage of recalls is indeed associated with more fatalities, using data from the NHTSA's Fatality Analysis Reporting System (FARS) described above.

The following equation summarizes our empirical strategy:

[35] The direct effect of dealer dollars is positive and insignificant in column (1), but becomes significant at the 10% level in column (2) when month fixed effects and additional controls are included. The overall effect on coverage is still negative when considering the linear combination of the direct effect and the interaction term (based on a two sided t-test).

$$log(fatalities_{mlt}) = \alpha + \theta_1 coverage_{mlt} + \theta_2 recall_{mt}$$
$$+ \theta_3 recall_{mt} \times coverage_{mlt} + X_{mlt} + \beta_l + \phi_m + \psi_t + \varepsilon_{mlt}$$

The dependent variable is the (logarithm of the) number of fatalities in a particular MSA l, involving vehicles of manufacturer m, occurred in month t. On the right-hand side we include i) $coverage_{mlt}$: the (logarithm of the) number of articles written about that manufacturer's recalls by newspapers in MSA l in month t, ii) $recall_{mt}$: a dummy for whether the manufacturer issued at least one recall in that month, iii) the interaction between the two previous variables, iv) X_{mlt}: Logarithm of the number of potentially affected vehicles, firm's share of local car demand and the total advertising expenditure in that MSA by a manufacturer over the past two years. , v) β_l, ϕ_m, ψ_t: MSA, manufacturer, and month fixed effects.

The coefficient of interest is θ_3, the interaction term between news coverage and the issuance of recalls in that month. Intuitively, this coefficient captures the idea that the more articles about a recall are published in the weeks after the recall is issued, the more people will be aware of the risks and able to take all necessary measures to prevent accidents.

According to the results in Table 13, the coefficient on the interaction between news coverage and the dummy for recalls in that month is negative and significant either at the 1% or the 5% level. This indicates that a larger number of articles published about recent recalls issued by a given manufacturer is associated with a significantly lower number of fatalities from accidents involving vehicles by that manufacturer. The effect is robust to the inclusion of MSA fixed effects (columns 2-5), month fixed effects (columns 3-5) and manufacturer fixed effects (columns 4-5). It is also persists when controlling for the mean level of advertising spending by the manufacturer in the MSA, the number of vehicles affected by the relevant recall(s), and the manufacturer's local market share (column 4-5), as well a for the interaction of all these variables with a linear (month) time trend (column 5). Taken together, this evidence highlights the potential life-saving value of the information disseminated by the press about recalls, and, indirectly, the potentially high cost for society of the distortion in news coverage due to advertisers' capture of the media.

11. 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. Moreover, the current literature does not focus on assessing the market conditions which might minimize such biases which are crucial for policy. 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. Using data on a large sample of U.S. newspapers also provides ample heterogeneity in market structure which allows us to draw policy conclusions. 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.

Analyzing the interaction of market structure and media bias, we find that competition between newspapers has a disciplining effect by reducing the amount of favorable coverage given to a manufacturer. 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 a robust supply-side bias due to advertising revenue. 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 through policies such as limiting concentration of media ownership and encouraging competition between media outlets.

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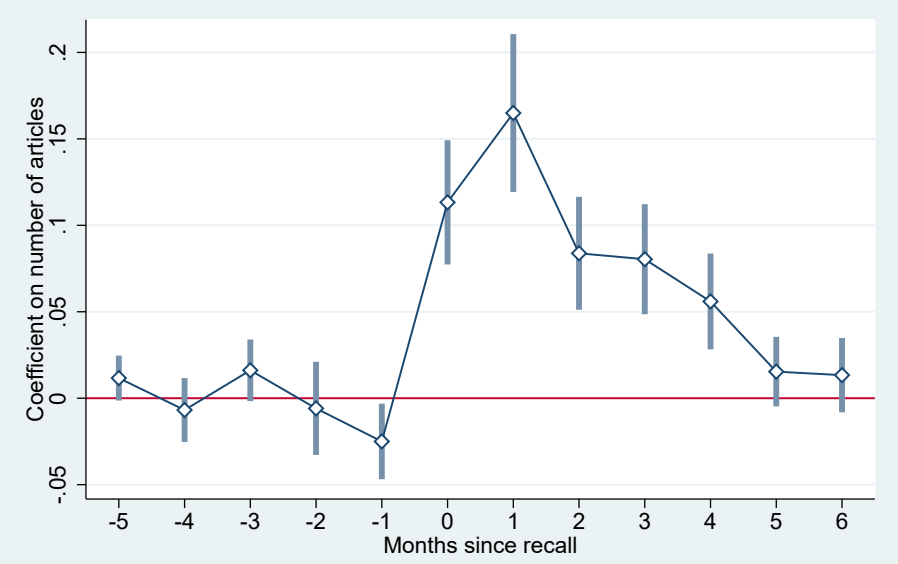
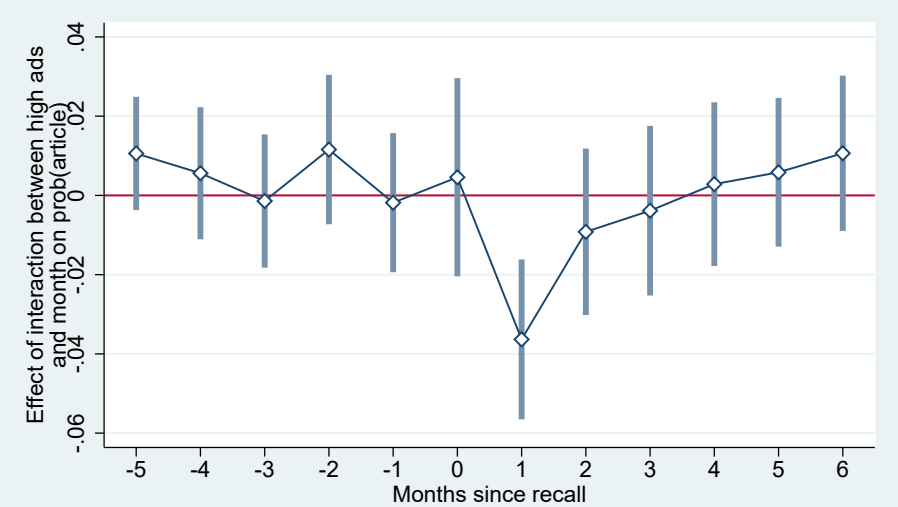
FIGURE 1: LANGUAGE USE IN FULL TEXT ARTICLES

FIGURE 2: 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.

FIGURE 3: 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 2 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.

FIGURE 4: COEFFICIENTS ON LAGGED QUARTERLY ADVERTISING SPENDING

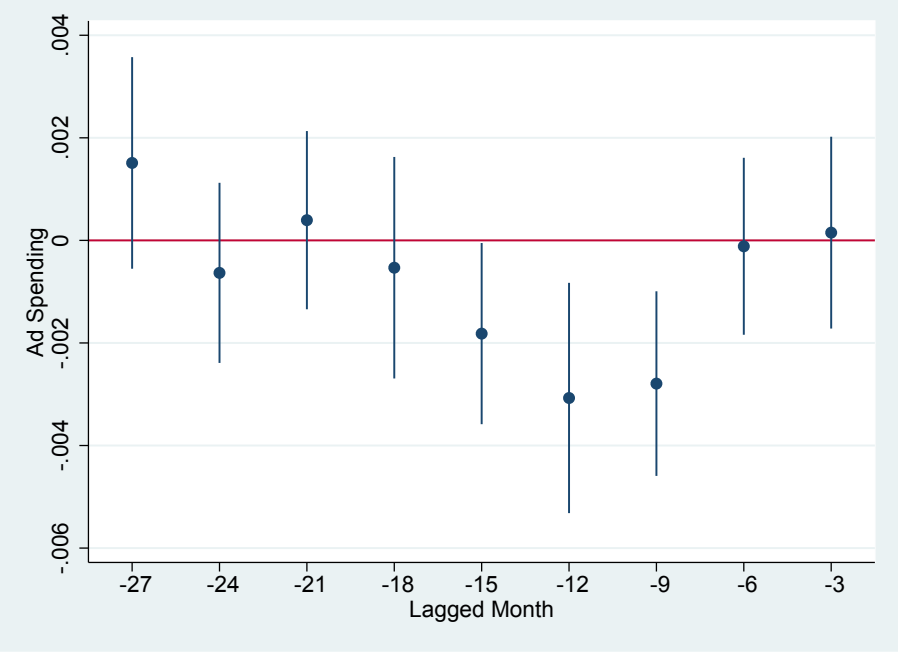


TABLE 1: ADVERTISING SPENDING AND RECALL-RELATED COVERAGE: EXTENSIVE MARGIN

	(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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 2: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 3: 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)
Firm's Share Local Cars	0.212*	0.181	0.230**	0.208*
	(0.115)	(0.115)	(0.116)	(0.119)
Firm's Share Local Cars × Defect	0.164***	0.212***		
	(0.029)	(0.035)		
Firm's Share Local Cars × No. Vehicles			0.016	0.170
			(0.101)	(0.127)
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 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). The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 4: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 5: BIAS AND CLOSURE OF NEWSPAPERS

	(1) P(articles)	(2) P(articles)	(3) P(articles)	(4) Log(articles)	(5) Log(articles)	(6) Log(articles)
Log Ad Spending × After Exit	-0.024**	-0.028**	-0.027**	-0.056***	-0.067***	-0.067***
(previous 2 years)	(0.009)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Log Ad Spending	-0.016*	0.0007	0.0003	-0.04**	-0.004	-0.004
(previous 2 years)	(0.009)	(0.012)	(0.012)	(0.019)	(0.024)	(0.024)
After Exit	0.410***	0.420***	0.419***	0.941***	1.014***	1.014***
	(0.112)	(0.121)	(0.121)	(0.267)	(0.266)	(0.265)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes
Craigslist	No	No	Yes	No	No	Yes
Observations	10,289	10,289	10,289	10,289	10,289	10,289
R-squared	0.194	0.264	0.264	0.209	0.372	0.372

Robust standard errors in parentheses clustered at the MSA 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). Controls include the mean number of potentially affected vehicles, the mean firm share of local car demand and the mean level of total articles written by the newspaper annually all aggregated at the MSA-month level which is also the unit of our analysis. We additionally control for the number of active newspapers in the MSA (interacted with After Exit).

TABLE 6: 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	-0.093	-0.047	0.179	0.226	-0.458	-0.524
(Previous two years)	(0.196)	(0.169)	(0.220)	(0.177)	(0.390)	(0.345)
Log Ad Spending x *Craigslist*	-0.345**	-0.314**	-0.550***	-0.508***	-0.079	0.045
(Previous two years)	(0.157)	(0.135)	(0.178)	(0.150)	(0.350)	(0.310)
Craigslist	0.012	0.0121	0.012	0.018**	0.012	0.254
	(0.009)	(0.008)	(0.011)	(0.009)	(0.022)	(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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 7: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 8: 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) Log(articles)
Log Ad Spending (previous 6 months)	-0.0582 (0.105)				0.140 (0.101)	0.0938 (0.116)
Log Ad Spending (6 to 12 months before)		-0.179* (0.107)			-0.201* (0.107)	-0.352** (0.140)
Log Ad Spending (1 to 2 years before)			-0.239*** (0.089)		-0.289*** (0.098)	-0.176 (0.113)
Log Ad Spending (2 to 3 years before)				-0.072 (0.082)	0.146 (0.099)	0.176 (0.124)
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	156,095	143,458	131,332	120,456	118,771	118,771
R-squared	0.176	0.171	0.168	0.170	0.170	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 firm (columns 1-5), and the log (+1) of the number of such articles (column 6). 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 9: 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 (6 to 18 months before)					-0.293***	-0.288***
					(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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 10: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 11: 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). The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 12: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE 13: RECALL-RELATED COVERAGE AND ROAD FATALITIES

VARIABLES	(1) Log(fatalities)	(2) Log(fatalities)	(3) Log(fatalities)	(4) Log(fatalities)	(5) Log(fatalities)
Log (total articles)	0.169***	0.155***	0.166***	0.0356**	0.0353**
	(0.0400)	(0.0238)	(0.0253)	(0.0140)	(0.0141)
Recall	0.0477***	0.0467***	0.0521***	-0.00231	-0.00222
	(0.00480)	(0.00476)	(0.00534)	(0.00537)	(0.00540)
Log (total articles) × Recall	-0.0562***	-0.0520***	-0.0497***	-0.0232**	-0.0220**
	(0.0157)	(0.0128)	(0.0131)	(0.0105)	(0.0106)
Manufacturer FE	No	No	No	Yes	Yes
Month FE	No	No	Yes	Yes	Yes
MSA FE	No	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes
Controls x Time Trend	No	No	No	No	Yes
Observations	110,597	110,597	110,597	92,463	92,463
R-squared	0.012	0.179	0.185	0.318	0.320

Robust standard errors in parentheses clustered at the MSA level. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the logarithm of the number of road fatalities associated with a manufacturer in an MSA in that month. Controls include the logarithm of the number of potentially affected vehicles, firm share of local car demand and the total advertising expenditure in that MSA by a manufacturer over the past two years. The timed trend in column (5) is a month time trend. The unit of observation in our empirical analysis is the MSA-manufacturer-month.

APPENDIX A: THEORETICAL EXTENSIONS (NOT FOR PUBLICATION)

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

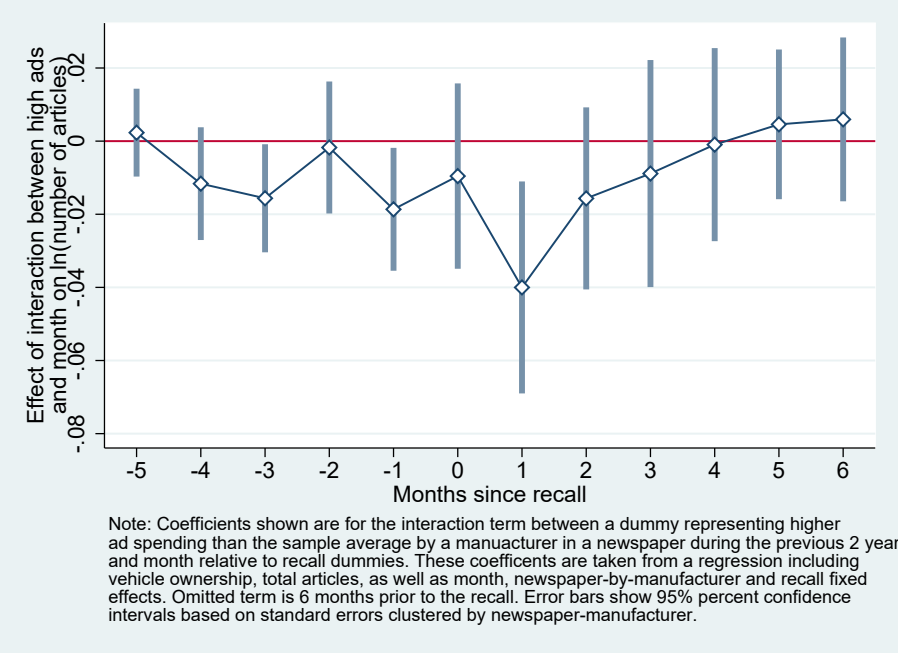
Suppose now that the manufacturer observes whether or not a recall occurs before placing their advertisements and can withdraw their advertising in the absence of a recall. In this case, advertising is only received in the recall state of the world, and newspapers will only enter an agreement when $(\rho - m)\sigma_n - F + pa > (\rho - m)\sigma_c - F$. 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: SUMMARY STATISTICS AND EVENT STUDY (NOT FOR PUBLICATION)

TABLE A1: 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

FIGURE A1: COEFFICIENTS OF HIGH ADS × MONTH SINCE RECALL ON NUMBER OF ARTICLES



We present summary statistics of key variables in Table A1 related to some of the key variables of interest used in the main analysis. Additionally, in Figure A1 we present event study results when the dependent variable is the number of recall-related articles (the intensive margin).

12. Appendix C: Robustness Checks (Not for Publication)

12.1. 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.[36] As shown in Table A2, 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.[37] 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. In columns (3) and (4) of Table A2, 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.[38]

Finally, we separately control for television coverage of recalls using data on recall-related coverage on evening news broadcasts by the top three networks (ABC, CBS and NBC) from the Vanderbilt Television News Archive.[39] 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.[40]

[36] 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.

[37] 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.

[38] 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.

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

[40] 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.

12.2. Non Linear Models and Alternative Specifications

In Table A3, 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.[41] 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 A3. 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 effects, we find that the results are in line with those in Tables 1, 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 A4 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)).

[41] 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.

TABLE A2: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE A3: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

TABLE A4: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

APPENDIX D: COMPETING ADVERTISERS (NOT FOR PUBLICATION)

Finally, we examine whether our results are robust to including controls for advertising by other manufacturers. In this analysis, we can also examine whether a newspaper provides less favorable coverage of recalls because of higher advertising by competitors of the manufacturer involved in the recall. To do so, we follow the literature and include a control for past advertising expenditure by other manufacturers in that newspaper.[42]

The results in Table A5 document that the baseline results are robust to controls for advertising by competitors. Moreover, we find that 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)).[43]

[42] 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.

[43] Different classifications of competitors based on information from sites such as http://www.hoovers.com/, Google search recommendations as well as foreign and domestic manufacturer splits lead to the same qualitative results.

TABLE A5: 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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.

APPENDIX E: TIMING ADDITIONAL RESULTS (NOT FOR PUBLICATION)

In Figure A2, 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 A6. 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.

FIGURE A2: COEFFICIENTS ON MONTHLY LEADS OF ADVERTISING SPENDING

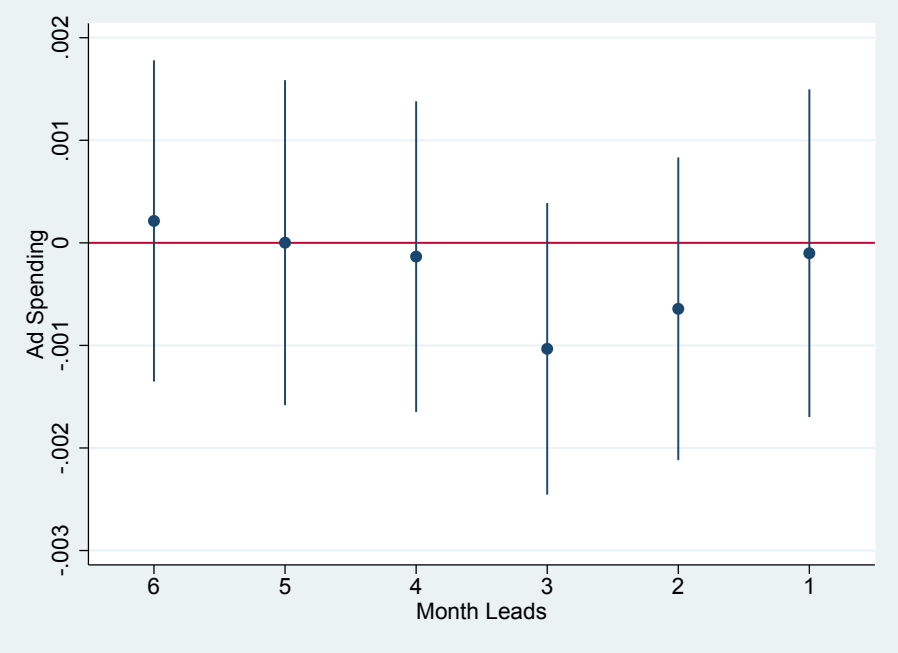


TABLE A6: LEADS OF AD SPENDING AND COVERAGE OF RECALL-RELATED ARTICLES

	(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. The unit of observation in our empirical analysis is the newspaper-month-manufacturer.