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

Graham Beattie,[a] Ruben Durante,[b] Brian Knight,[c,d] Ananya Sen[e]

[a] Loyola Marymount University, Los Angeles, California 90045; [b] ICREA, Universitat Pompeu Fabra, IPEG, Barcelona GSE, and CEPR, Barcelona, Spain 08002; [c] Brown University, Providence, Rhode Island 02912; [d] National Bureau of Economic Research, Cambridge, Massachusetts 02138; [e] Carnegie Mellon University, Pittsburgh, Pennsylvania 15213

Contact: graham.beattie@lmu.edu (GB); ruben.durante@upf.edu, https://orcid.org/0000-0003-2833-0063 (RD); brian_knight@brown.edu (BK); ananyase@andrew.cmu.edu (AS)

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Abstract. Do mass media bias content in favor of advertisers? If so, what market conditions limit or exacerbate this bias? We examine the relationship between advertising by auto manufacturers in U.S. newspapers and news coverage of car safety recalls between 2000 and 2014. This context allows us to separate the influence of advertisers, who prefer less coverage, from that of readers, who prefer more information about the safety risks associated with the recalls. Consistent with theoretical predictions, we find that newspapers provide less coverage of recalls issued by manufacturers that advertised more regularly on their pages over the previous two years. The effect is especially pronounced for more severe recalls, which are more likely to hurt manufacturers' reputations. Competition for readers from other newspapers mitigates proadvertiser bias, and competition for advertising by online platforms exacerbates it. We also present suggestive evidence that less news coverage of recalls is associated with more fatal car accidents.

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1. Introduction

Mass media play a key role in informing citizens' decisions and in exposing corporate misconduct (Dyck et al. 2008, Strömberg and Snyder 2010, Harrison et al. 2018). Given the influence of the media on public opinion, powerful corporate interests may have a strategic incentive to "influence" the media to promote friendly coverage (Besley and Prat 2006). Although 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 underexplored concerns the influence of corporate advertisers on editorial decisions. Commercial media outlets rely heavily on advertising revenues and may prefer to underreport negative information about advertisers to avoid alienating them. Indeed, several real-world examples indicate that advertisers may change their spending decisions 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, crucially, what market conditions may exacerbate this risk are important questions with evident media strategy and policy implications. These questions are more broadly related to core issues of platform strategy: How do incentives on one side of the platform affect quality provision on the other? How does competition within a two-sided market setting influence such strategies?

From an empirical point of view, identifying the causal impact of advertising spending on media bias is challenging because of the two-sided nature of media markets. On the one hand, consumers have preferences over content that they like to see (Gentzkow and Shapiro 2010). On the other hand, advertisers have preferences over consumers as they try to reach individuals who 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). Because the two forces are inextricably linked and typically push content in the same 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, although car industry advertisers are likely to prefer less coverage of recalls as coverage may damage their reputation (Freedman et al. 2012, Gao et al. 2015), 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, as car defects can result in serious accidents, this case illustrates well the potential social costs of a lack of corporate accountability resulting from 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 and cross-ownership influence proadvertiser 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 United States between 2000 and 2014; we focus in particular on the recalls of the nine largest manufacturers of the U.S. auto market.[2] 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 more than 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 local demand and, thus, to separate supply- 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 smaller 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 in which 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 proadvertiser bias is less pronounced in markets with more newspapers, suggesting that competition for readers, which could increase reputation concerns, has a disciplining effect on editorial choices.[3] Second, we find 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, although 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. To this end, 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, and 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 a lack of public awareness about recalls has potentially significant social costs. In particular, we document that less coverage of the recalls by a manufacturer is associated with a higher number of fatal car accidents involving vehicles by that manufacturer immediately after the recall. This result highlights the informative value of recall-related news and illustrates the potential cost 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, 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, and by Reuter and Zitzewitz (2006) on the effect of advertising spending by mutual funds. All these contributions face similar identification issues because of the possibility of "correlated tastes" between advertisers and readers discussed earlier, which our empirical strategy fully addresses. Moreover, our study is the first to our knowledge to investigate in depth what market conditions can favor or deter media capture by advertisers and to provide clear strategic and policy recommendations.

In this respect, our finding that bias is less likely in markets with more newspapers dovetails nicely with previous theoretical and empirical results on 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 makes 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.[4]

More broadly, our paper complements studies on platform strategy and the potential conflict of interest of (dominant) platforms. Kim and Luca (2019) show how a dominant platform, such as Microsoft or Google, might abuse its position by highlighting its own product, which might be of a lower quality. In our context, dominant newspapers (or those in less competitive markets) bias content to appease favorable advertisers potentially at the detriment of the final consumer.[5] In our setting, platforms use a nonprice strategy to curry favor with advertisers, which is similar to the general point of the model by Halaburda et al. (2017), who show theoretically why platforms might strategically restrict choice on one side of the market to gain a competitive advantage. In line with our setting of platform content being shaped by monetary incentives, Sun and Zhu (2013) show how bloggers in China altered their content when ads start running on their websites.

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, and 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 (Federal Trade Commission 2010). Car manufacturers are among newspapers' largest advertisers; as of 2006, total ad spending by the automotive sector amounted to more than 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, it is 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 information on the nature of the problem, the associated risks, how an owner can access the free remedy, how long the repair takes, 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 by a recall and the number of accidents, injuries, and fatalities associated with it as well as on other recent recalls issued by the same manufacturer—all 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.

Automakers, in contrast, can be seriously hurt by recalls, especially when these involve millions of vehicles, severe defects, and fatal safety risks. Indeed, extensive evidence from automotive and other product recalls indicates that the reputation cost inflicted by major recalls is associated with a decline in a manufacturer's stock price and in the demand for its products (Jarrell and Peltzman 1985, Pruitt and Peterson 1986, Dranove and Olsen 1994, Barber and Darrough 1996, Chu et al. 2005, Freedman et al. 2012). In light of this, it is reasonable to think that manufacturers would attempt to minimize the negative publicity associated with the recalls, including by influencing the media toward providing less hostile coverage.

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. Although readers demand more information about recalls, advertisers prefer less coverage because it can potentially hurt their reputation. Although 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. Note that the model makes a number of simplifying assumptions (for example, regarding competition between newspapers), and alternative models may make different predictions. Nonetheless, we believe the model provides value in terms of both providing a set of testable predictions and organizing the empirical analysis.

3.1. Setup

Let p be the probability that 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, 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 discussed previously, the paper 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 to subscribe. Finally, nature chooses whether a recall occurs and payoffs are realized.

3.2. Equilibrium

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

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

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 these results, 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 because 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 and provide a lengthier discussion and model details in the online appendix.

1. Intensive margin. Although our baseline model considers the decision by the newspaper of whether 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 recall-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. Although 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 because of, for example, 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 noncontractual quid pro quo relationship between the paper and the manufacturer because of, 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 is 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 a recall is forthcoming, it only advertises when there is potential coverage to suppress. Expecting to receive no advertising if a recall is not forthcoming, the newspaper demands 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, (iv) vehicle ownership by manufacturer and media market, and (v) 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 United States between 2000 and 2014 are available from the 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. We focus on the nine manufacturers represented at least once in the top 100 recalls in terms of the number of affected vehicles[8] during our 15-year sample period.[9] These nine manufacturers

had more than 1,800 recalls in total during our sample period. Although our baseline analysis focuses on coverage of all recalls, we also conduct an analysis of recall-specific coverage for the top 54 recalls, those involving more than 1 million vehicles. Because major recalls often affect 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 2000–2014 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 negatives. Specifically, an article is deemed to concern a recall if it contains the words "safety" and "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 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 in the online appendix, there is a 7.1% 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 used in articles from five newspapers in our sample.[13] As shown, there is significant representation of words with a negative tone, such as "problem," "investigation," and "deaths," and there is little evidence of words indicating a positive tone. In addition, we also read a random sample of recall-related articles from these same newspapers that was coded by a research assistant. The information is summarized in Figure 2, which shows that 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 should be considered negative news for the manufacturer, particularly because it is the larger recalls that eventually get covered. Other common pieces of information include the number of accidents, injuries, or deaths caused by the defective part; comparisons with other recent recalls; and quotes and analysis by industry experts.

Figure 1. (Color online) Language Use in Full Text Articles

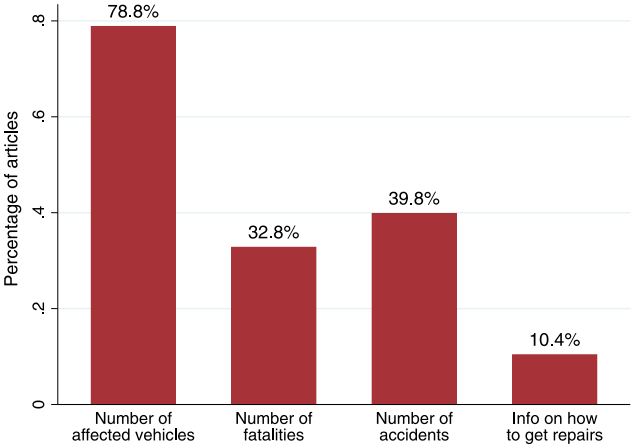
4.3. Advertising Expenditures

Data on advertising spending by both car manufacturers and local car dealers were purchased from the Ad$pender database produced by Kantar Media. The data set 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 in the online appendix, the average monthly advertising expenditure per newspaper by a manufacturer is $102,300.

4.4. Vehicle Ownership Information

To measure the demand for news about the recalls of different manufacturers, 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 area (MSA) level; specifically, we assign each newspaper the shares of vehicles by manufacturer in

Figure 2. (Color online) Content in Full Text Articles



the MSA in which the newspaper's headquarters are located. Because the NHTS survey was only conducted in 2001 and 2009; data for the other years are imputed via interpolation. As shown in Table A1 in the online appendix, the mean market share for a car manufacturer is 8% with a maximum of about 27%.

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 and 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:

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

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 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] The variable $advertising_{mn(t-i)}$ 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 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 because 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. Because of 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. 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]

As noted, our unit of observation is newspaper–manufacturer–month. A natural alternative would be to frame our analysis around specific manufacturer recalls with the unit of observation being newspaper–recall. As a robustness check, we do later develop recall-specific coverage measures for the largest recalls, those involving more than one million affected vehicles. But, for several reasons, we choose newspaper–manufacturer–month as our baseline unit of observation. First, manufacturers frequently have multiple recalls that are occurring simultaneously, and newspaper articles may also reference more than one recall, which makes it hard to assign an article to a specific recall. Indeed, among all recalls, conditional on any recall being initiated in a given month, the median number of other recalls being initiated in the same month is four.[18] Second, and more crucially, measuring recall-specific coverage requires additional keyword searches. Note that, as described in Section 4.2, we identify articles covering recalls via the keywords "recall" and "safety" in our baseline specification. Then, focusing on specific recalls requires additional search terms. In addition to the model of the vehicle, we need to include terms such as "brakes" for a recall focused on braking systems. This may lead us to miss important articles that, for example, discuss deaths related to this recall but that do not use the word "brakes." In addition, we may include articles that mention brakes but that are, in fact, related to a different recall for this manufacturer. Thus, additional search terms may introduce false negatives, important articles that are missed, and false positives, articles that are mistakenly included in our analysis. In addition, our database covers more than 1,800 recalls; choosing consistent keywords for each recall would involve a number of discretionary choices, so we prefer to limit this approach to a robustness check.

6. Results

Using the empirical strategy laid out in the previous section, we are able to present a fairly complete picture of the effect of advertising on newspaper coverage of car safety recalls.

We begin by presenting our baseline results showing an effect of advertising on both the extensive and intensive margins of coverage. Because this result must be driven by profit-maximizing behavior, it should be a function of market structure. Indeed, we show that competition in both the newspaper and advertiser market affects the relationship between advertising and coverage.

The richness of our data allows us not just to identify this relationship, but also to describe it in considerable detail. Specifically, we are able to show that the effect of medium-term (6 to 18 months) advertising is strongest, that advertisers that consistently advertise in a newspaper have a stronger influence over the newspaper's coverage, that domestic manufacturers and larger advertisers have a stronger effect on coverage, and that larger newspapers respond more to manufacturers and smaller newspapers respond more to car dealerships. Taken together, these results clarify our main analysis by pointing to mechanisms by which advertising can influence coverage. They highlight the importance of a sustained relationship between an advertiser and newspaper with opportunities for both parties to monitor each other.

Finally, we present an example of the social cost of advertiser-driven bias by showing suggestive evidence that coverage of safety recalls affects road fatalities.

6.1. Baseline Results

In Table 1, we examine the relationship between advertising spending and news coverage of recalls along the extensive margin using as the 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 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.[19] 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

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 two 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 fixed effects	No	No	No	Yes	Yes
Newspaper × Manufacturer	No	Yes	Yes	Yes	No
Newspaper fixed effects	No	No	No	No	Yes
Firm fixed effects	No	No	No	No	Yes
Observations	131,332	131,332	131,332	131,332	131,332
R^2	0.007	0.124	0.129	0.168	0.14

Notes. Robust standard errors in parentheses clustered at the newspaper–manufacturer level. 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 coefficients of "Log ad spending (previous two years)" and "Log affected vehicles" are scaled up by a factor of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

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 two 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 fixed effects	No	No	No	Yes	Yes
Newspaper × Manufacturer fixed effects	No	Yes	Yes	Yes	No
Newspaper fixed effects	No	No	No	No	Yes
Firm fixed effects	No	No	No	No	Yes
Observations	131,332	131,332	131,332	131,332	131,332
R^2	0.005	0.140	0.145	0.201	0.161

Notes. Robust standard errors in parentheses clustered at the newspaper–manufacturer level. The dependent variable is the log(+1) of the number of articles that a newspaper writes about the recalls of the vehicles produced by a given manufacturer. To improve legibility, the coefficient of "Log ad spending (previous two years)" and "Log affected vehicles" are scaled up by a factor of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

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.[20] In terms of magnitudes, we find that doubling advertising spending reduces the probability of coverage by 0.2 to 0.7 percentage points, which is between 3% and 10% of the baseline probability of coverage of 7%. Finally, in column (5), 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 indicates that our baseline result does not depend on the inclusion of newspaper–manufacturer fixed effects, but that the latter does capture something substantive about the relationship between manufacturers and media outlets and about the underlying demand factors of each media market.[21]

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 a 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; specifically, we find that a doubling of advertising spending in the preceding two years decreases the quantity of coverage of a recall by 2%–3%. The effect is statistically significant and robust to controlling for newspaper × 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)). Because the specifications use total coverage of recalls as the dependent variable, both the intensive and extensive margin results show that advertising does not just affect the timing of coverage of recalls, but reduces the total amount of coverage.

Our baseline results include newspaper × manufacturer fixed effects. We also show that our results are robust to having a different source of variation coming from newspaper and manufacturer fixed effects separately. We next consider alternative levels of fixed effects, which might account for region-specific demand shocks or seasonality. In particular, we look at stringent fixed effects at the level of state–month in columns (1) and (4) of Table 3 to find that our results are qualitatively similar. In addition, we include newspaper × month fixed effects (columns (2) and (5)), which, again, account for highly granular newspaper-specific strategies. Finally, we include fixed effects for the degree of competition (e.g., one newspaper, two newspapers, etc.) by month in columns (3) and (6). These account for seasonality variation in differences across markets according to the degree of competition. All of our key results remain statistically significant at the conventional (95% or 90%) levels.

We then test the prediction of our model regarding the relationship between proadvertiser 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

Table 3. Alternative Fixed Effects: Monthly

Variables	(1) P(articles)	(2) P(articles)	(3) P(articles)	(4) Log(articles)	(5) Log(articles)	(6) Log(articles)
Log ad spending (previous two years)	–0.225** (0.109)	–0.187* (0.106)	–0.188* (0.109)	–0.285** (0.121)	–0.217* (0.123)	–0.280** (0.124)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	State × Month	News × Month	Comp. × Month	State × Month	News × Month	Comp. × Month
Observations	130,844	131,332	131,332	130,844	131,332	131,332
R^2	0.214	0.377	0.113	0.238	0.406	0.129

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. 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 the log(+1) of the number of such articles (columns (4)–(6)). To improve legibility, the coefficient of Log(2 year ad spending) is scaled up by a factor of 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. Comp., competition.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

defect(s) that motivated the recall concerned vital components, such as the engine, accelerator, brakes, airbags, steering, electrical system, fuel system, or powertrain.[22] 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 100 recalls. As shown in Table 4, the interaction between advertising spending and seriousness of the recall is negative and statistically significant, for both the extensive and intensive margins (columns (1) and (2), respectively). The amount of coverage reduced by a given amount of advertising dollars is almost three times as large for a major than a minor defect. A similar result applied to recalls that affected a large number of vehicles for both the extensive and intensive margins (columns (3) and (4), respectively). Interestingly, the interaction term between local brand-specific ownership and either measure of the severity of recalls displays a positive and significant coefficient, consistent with local readers demanding

Table 4. Advertising Spending and Severity of Recalls

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Log ad spending (previous two years)	–0.179* (0.102)	–0.162* (0.0963)	–0.239** (0.101)	–0.221** (0.0930)
Log ad spending × Defect (previous two years)	–0.252*** (0.0801)	–0.302*** (0.0968)		
Log ad spending × Number of vehicles (previous two years)			–0.590** (0.260)	–0.920** (0.385)
Firm's share local cars	0.212* (0.115)	0.181 (0.115)	0.230** (0.116)	0.208* (0.119)
Firm's share local cars × Defect	0.164*** (0.029)	0.212*** (0.035)		
Firm's share local cars × Number of vehicles			0.016 (0.101)	0.170 (0.127)
Controls	Yes	Yes	Yes	Yes
Controls× Severity measure	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R^2	0.169	0.203	0.171	0.205

Notes. Robust standard errors in parentheses clustered at the Newspaper-Firm level. 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) and (3)) and the log(+1) of the number of such articles (columns (2) and (4)). To improve legibility, the coefficients on all lags of Log ad spending are scaled up by a factor of 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 × Severity measure includes interactions of control variables with dummies if there was a recall involving an important component such as the engine, accelerator, brakes, and so forth, (Defect) in columns (1) and (2) and if the recall was severe in terms of the number of vehicles affected (Number of vehicles) in columns (3) and (4). The unit of observation in our empirical analysis is the newspaper–month–manufacturer.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

more information for recalls involving more serious safety risks. These results highlight that recalls receiving less coverage because of 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, because of advertisers' influence, newspapers may provide inadequate coverage of those recalls that are potentially more relevant for consumers' safety and for which information would be most valuable, highlighting the potentially large social cost of media capture.

As a next step, digging deeper into the data, we also develop recall-specific measures of news coverage for recalls with more than one million affected vehicles.[23] 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 six months of the recall. Our first finding is that the timing of articles is strongly correlated with recall events. In particular, Figure 3 documents that coverage spikes during and immediately after a recall and lasts up to four 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 4, newspapers are less likely to cover recalls when they have recently received more advertising than usual from a manufacturer.[24] These effects are strongest during the month immediately after the month the recall is issued with coverage returning to normal shortly after. Taken together, this evidence indicates 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) nonlinear 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 and the tone of the articles rather than the number of articles as measure of news coverage,[25] (9) controls for and consideration of advertising by competing manufacturers, (10) some additional endogeneity checks to rule out alternative explanations associated with the variation we utilize in our baseline results, (11) alternative quarterly fixed effects, (12) alternative clustering strategies, and (13) baseline specifications and event study specifications that account for overlap in recalls.

Figure 3. (Color online) Timing of Articles Around a Recall

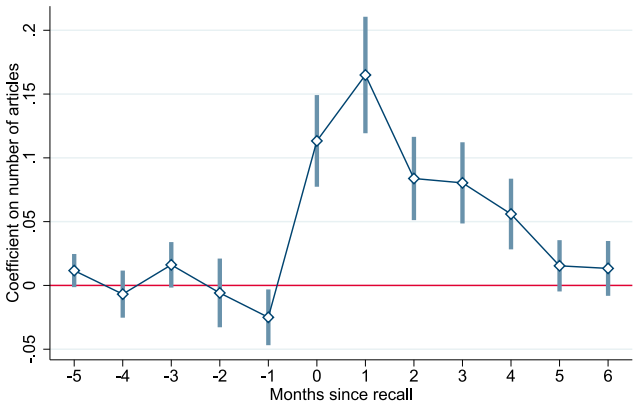
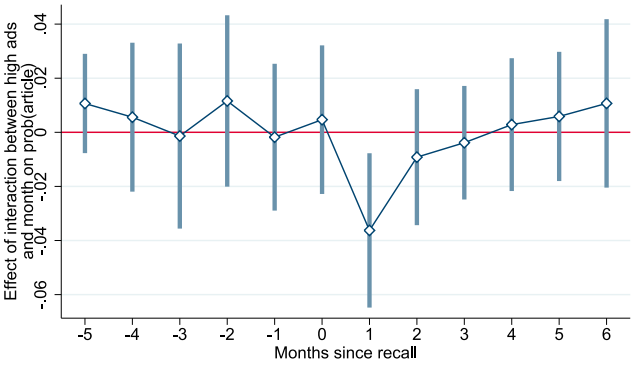


Figure 4. (Color online) Coefficients on High Ads × Month Since Recall on Probability of Article



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.[26]

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 proadvertiser bias because of newspapers' concern about losing reputation and readers if their underreporting of recalls is unveiled. Although our simple model predicts that reputation concerns 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 proadvertiser 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 5, we estimate our baseline specification augmented by the interaction between prior advertising spending and the measure of competition. For both the extensive and intensive margins 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 magnitude of the coefficients suggests that the bias caused by advertising is eliminated in cities with newspaper competition.

This 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.[27] To assess the robustness of 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.[28] To be consistent with these results, we should expect that a reduction in competition should increase biased coverage because the reputation effects become less of a threat. The unit of analysis is the MSA–month.

The results in Table 6 show that the findings are consistent with those using cross-sectional variation only. In particular, we find MSAs that see a newspaper closure (after exit) tend to bias their coverage more, particularly if they get higher advertising revenue from the manufacturers, in terms of both the probability of writing an article (columns (1) and (2)) and the number of articles (columns (3) and (4)). The results are robust to controlling for month fixed effects as well the entry of Craigslist into the MSA.[29] 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. To ensure that this result is robust, we also carry out an event study to look at the impact of newspaper exit on coverage decisions in Figure A2 in the online appendix. One can see that there are no discernible pretrends (with period $t-1$ being the omitted year), and after the exit, existing newspapers bias their coverage more in favor of their advertisers.

This finding provides suggestive evidence that competition has a disciplining effect on bias, which is consistent with previous work. 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.[30] 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.

Table 5. Media Bias and Newspaper Competition

	(1) P(articles)	(2) P(articles)	(3) Log(articles)	(4) Log(articles)
Log ad spending (previous two years)	−0.415*** (0.141)	−0.462*** (0.143)	−0.430*** (0.140)	−0.465*** (0.145)
Log ad spending × Newspaper competition (previous two years)	0.501** (0.194)	0.569*** (0.193)	0.536*** (0.201)	0.579*** (0.204)
Controls	Yes	Yes	Yes	Yes
Controls × Newspaper competition	No	Yes	No	Yes
Month fixed effects	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R^2	0.168	0.168	0.201	0.202

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. 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 of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

Table 6. Bias and Closure of Newspapers

	(1) P(articles)	(2) P(articles)	(3) Log(articles)	(4) Log(articles)
Log ad spending × After exit (previous 2 years)	–0.020** (0.009)	–0.021** (0.009)	–0.062*** (0.015)	–0.063*** (0.015)
Log ad spending (previous 2 years)	–0.0003 (0.010)	–0.0002 (0.010)	–0.011 (0.025)	–0.011 (0.025)
After exit	1.146 (1.023)	1.158 (1.016)	0.486 (1.72)	0.541 (1.72)
Controls	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Craigslist	No	Yes	No	Yes
Observations	10,531	10,531	10,531	10,531
R^2	0.274	0.274	0.387	0.387

Notes. Robust standard errors in parentheses clustered at the MSA level. 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) and (2)) and the log(+1) of the number of such articles (columns (3) and (4)). 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).

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

7.2. Craigslist and Media Bias

We then consider the impact of competition in the advertising market. The theoretical implications of this are more clear because we can separate competition on the advertising side of the market from competition for readers. 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 empirically, we exploit the staggered introduction across U.S. media markets 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 on the 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 in which 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.[31] 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 because almost all of Craigslist entry took place by 2005.[32] As reported in Table 7, for both the extensive and intensive margins, 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 is suggestive evidence 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)), and no significant effect holds for the others (columns (5) and (6)).[33] Finally, we also carry out an event study to look at the impact of Craigslist entry on coverage decisions in Figure A3 in the online appendix. There are no discernible pretrends (with year $t-1$ being the omitted category) before Craigslist entry, and after the entry, existing newspapers bias their coverage more in favor of their advertisers.

Table 7. Ad spending, Bias, and Craigslist

	Full sample (1) P(articles)	Full sample (2) Log(articles)	Classified ads manager (3) P(articles)	Classified ads manager (4) Log(articles)	No classified ads manager (5) P(articles)	No classified ads manager (6) Log(articles)
Log ad spending (previous two years)	–0.093 (0.196)	–0.047 (0.169)	0.179 (0.220)	0.226 (0.177)	–0.458 (0.390)	–0.524 (0.345)
Log ad spending × Craigslist (previous two years)	–0.345** (0.157)	–0.314** (0.135)	–0.550*** (0.178)	–0.508*** (0.150)	–0.079 (0.350)	0.045 (0.310)
Craigslist	0.012 (0.009)	0.0121 (0.008)	0.012 (0.011)	0.018** (0.009)	0.012 (0.022)	0.254 (0.019)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	55,363	55,363	39,511	39,511	15,508	15,508
R^2	0.174	0.193	0.170	0.192	0.195	0.206

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. 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 of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

In sum, 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 in other newspapers controlled by the same owner. In the first two columns of Table 8, 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. Although 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, on both the extensive and intensive margins (columns (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 in both the same and other markets. Consistent with the previous result, ad spending in sister outlets in both the same MSA and elsewhere display statistically insignificant coefficients, confirming the absence of spillovers in proadvertiser bias within publishing groups.

These results suggest that the lack of unified strategy by media conglomerates favors advertisers. Though specific to the issue of proadvertiser 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, and DellaVigna and Hermle (2017) find no evidence that media outlets provide more favorable coverage of movies produced by companies in the same group. DellaVigna and Hermle (2017) point out that a lack of an effect of ownership on bias may be the result of a high cost of bias, a low return to bias, or organizational failure. The fact that we find consumers and advertisers do drive coverage suggests that the third explanation is most likely in our context. Newspapers within an ownership group do not appear to internalize benefits across newspapers but instead act as individual profit-maximizing entities.

8. Timing

Although in our baseline analysis we focus on advertising spending in the previous two years, we are also interested in further understanding the timing of the relationship between ad spending and coverage. In Figure 5, 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 two to three years

Table 8. Ownership Structure and Media Bias

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Log ad spending (previous two years)	–0.273** (0.108)	–0.279*** (0.107)	–0.268** (0.108)	–0.266** (0.108)
Log other ad spending in MSA (previous two years)	0.021 (0.122)	0.037 (0.118)	0.026 (0.122)	0.047 (0.119)
Log other ad spending outside MSA (previous two years)			–0.134 (0.176)	–0.286 (0.201)
Controls	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332
R^2	0.168	0.201	0.168	0.201

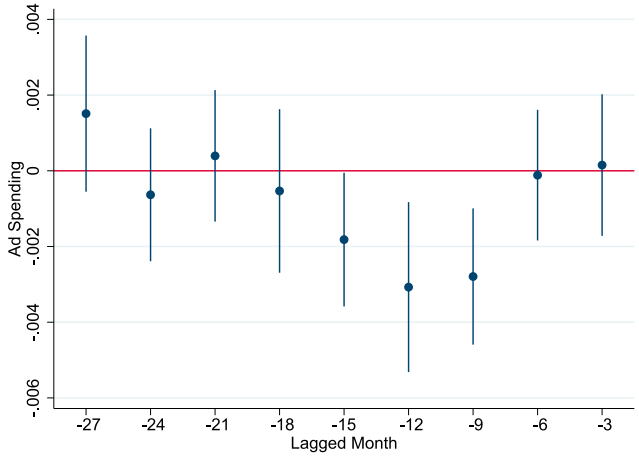
Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. The dependent variable is the probability that a newspaper writes one or more articles about the recalls of the vehicles produced by a given manufacturer (columns (1) and (3)) and the log(+1) of the number of such articles (columns (2) and (4)). To improve legibility, the coefficient of Log(2 year ad spending) is scaled up by a factor of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

(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 three to five quarters before.

To corroborate this evidence, in Table 9, we reestimate our baseline specification, including, separately and then simultaneously, different lags of ad spending. Although 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 6 to 12 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) in which 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.

Figure 5. (Color online) Coefficients on Lagged Quarterly Advertising Spending



To confirm the lack of impact of ad spending in the months right before recalls, in Table 10, 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 when both included separately (columns (1)–(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), for both the extensive and intensive margins (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

Table 9. 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 six months)	−0.0586 (0.104)				0.129 (0.099)	0.077 (0.116)
Log ad spending (6 to 12 months before)		−0.179* (0.107)			−0.201* (0.107)	−0.353** (0.141)
Log ad spending (one to two years before)			−0.242*** (0.089)		−0.284*** (0.099)	−0.168 (0.114)
Log ad spending (two to three years before)				−0.081 (0.081)	0.136 (0.100)	0.160 (0.124)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Newspaper × Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	156,095	143,458	131,332	118,891	117,208	117,208
R^2	0.176	0.169	0.166	0.167	0.203	0.206

Notes. Robust standard errors in parentheses clustered at the Newspaper-Firm level. 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 of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

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. Although our model is static, one could envision a dynamic setting in which 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

Table 10. 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 $t-1$	0.012 (0.102)			−0.033 (0.0871)	−0.001 (0.0899)	−0.011 (0.0809)
Log ad spending in month $t-2$		0.032 (0.102)		0.0874 (0.0856)	0.105 (0.0900)	0.0744 (0.0765)
Log ad spending in month $t-3$			−0.007 (0.103)	−0.053 (0.0882)	0.0395 (0.088)	0.002 (0.0823)
Log ad spending (6 to 18 months before)					−0.293*** (0.0985)	−0.291*** (0.106)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	157,136	156,138	155,359	153,101	135,360	135,360
R^2	0.175	0.175	0.175	0.176	0.199	0.20

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. 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 of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

coverage, in Table 11, we regress coverage on a dummy for whether the manufacturer's spending has been above the median for each of the 24 previous months. The results of the first two columns indicate that stable spending is associated with lower coverage of recalls for both the extensive and intensive margins. 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, in which 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 versus foreign manufacturers, and (ii) dealer versus 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 because newspapers with higher circulation should have 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 12, the coefficient on the interaction term is negative and highly statistically significant for both the extensive and 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 (2006), 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 12, 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.[34] 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 12, 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 to, for example, the existence of closer personal and business relationships between the top management of the U.S. auto industry and U.S. media, particularly

Table 11. Stable Advertising Spending and Coverage

	(1) P(articles)	(2) Log(articles)	(3) P(articles)	(4) Log(articles)
Consistent spending (previous two years)	–0.199*** (0.0661)	–0.134** (0.0640)	–0.191*** (0.0667)	–0.126* (0.0646)
Log ad spending (previous two years)			–0.278** (0.111)	–0.289*** (0.112)
Controls	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes
Observations	128,803	128,803	128,803	128,803
R^2	0.165	0.198	0.165	0.198

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. 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) and (3)) and the log(+1) of the number of such articles (columns (2) and (4)). To improve legibility, the coefficients on all lags of Log ad spending are scaled up by a factor of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

Table 12. 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)	–0.107 (0.082)	–0.094 (0.084)	0.020 (0.102)	0.039 (0.0917)	–0.059 (0.117)	–0.066 (0.110)
Ad spending × Large paper (previous two years)	–0.643* (0.336)	–0.714** (0.362)				
Ad spending × Large manufacturer (previous two years)			–0.706*** (0.218)	–0.750*** (0.226)		
Ad spending × Domestic (previous two years)					–0.616** (0.242)	–0.583** (0.258)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	131,332	131,332	131,332	131,332	131,332	131,332
R^2	0.168	0.202	0.170	0.204	0.169	0.202

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. 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 of 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 and firm share of local car demand. Controls × 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

the largest ones.[35] In line with this hypothesis, our results indicate that, conditional on total advertising, a dollar spent by domestic automakers is associated with significantly less coverage of safety recalls than a dollar spent by foreign manufacturers, for both the extensive and intensive margins.

Although 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 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 because, in this case, transaction and monitoring costs are likely to be lower also because of 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 13, 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.[36] We find very similar results for the intensive margin (columns (3) and (4)). Taken together, these results point 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 because of 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 the appropriate actions to take to address them, capture and the resulting underreporting of recall-related news would lead to suboptimal levels of awareness and a higher risk of accidents and fatalities.

In this section, we provide suggestive evidence showing that less news coverage of recalls is indeed associated with more fatalities, using data from the NHTSA's FARS described earlier.

The following equation summarizes our empirical strategy:

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

Table 13. Dealer Dollars and Small Newspapers

	(1) P(articles)	(2) P(articles)	(3) Log(articles)	(4) Log(articles)
Dealer ad spending	0.469	0.767*	0.384	0.747*
(previous two years)	(0.447)	(0.437)	(0.435)	(0.432)
Dealer ad spending × Small paper	–0.973**	–1.04**	–0.915**	–1.02**
(previous two years)	(0.457)	(0.448)	(0.448)	(0.445)
Manufacturer ad spending	–0.284	–0.175	–0.371**	–0.249
(previous two years)	(0.189)	(0.174)	(0.188)	(0.173)
Manufacturer ad spending × Small paper	0.388*	0.404**	0.461**	0.495**
(previous two years)	(0.211)	(0.201)	(0.209)	(0.203)
Controls	No	Yes	No	Yes
Month fixed effects	No	Yes	No	Yes
News × Manufacturer fixed effects	Yes	Yes	Yes	Yes
Observations	129,950	129,950	129,950	129,950
R^2	0.124	0.167	0.138	0.20

Notes. Robust standard errors in parentheses clustered at the newspaper–firm level. The dependent variable in columns (1) and (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) and (4). To improve legibility, the coefficients of Log(2 year ad spending) are scaled up by a factor of 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

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}: the logarithm of the number of potentially affected vehicles, the firm's share of local car demand, and the total advertising expenditure in that MSA by a manufacturer over the past two years; and (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 that 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.

Table 14. 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 fixed effects	No	No	No	Yes	Yes
Month fixed effects	No	No	Yes	Yes	Yes
MSA fixed effects	No	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes
Controls × Time trend	No	No	No	No	Yes
Observations	110,597	110,597	110,597	92,463	92,463
R^2	0.012	0.179	0.185	0.318	0.320

Notes. Robust standard errors in parentheses clustered at the MSA level. 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.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

According to the results in Table 14, the coefficient on the interaction between news coverage and the dummy for recalls in that month is negative and significant at either the 95% or 99% 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) and (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 (columns (4) and (5)) as well as for the interaction of all these variables with a linear (month) time trend (column (5)). These specifications address much of the endogeneity issue stemming from a causal effect of fatalities on coverage and highlight 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 resulting from 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 2018). 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 that might minimize such biases, which are crucial for policy. We overcome these challenges by analyzing media bias in the context of car safety recalls, with which 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- to 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 and 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 resulting from advertising revenue. The vulnerability of newspapers to influence by advertisers and the role of market structure has implications for policy makers. Advertising is a major vector through which corporate interests can capture the media and public opinion. Some changes to the media landscape, such as the introduction of Craigslist, may serve to exacerbate this effect, and others, such as increased competition, may mitigate it. Our results argue that regulators should seek to formulate rules that 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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Endnotes

[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 automaker. Another eminent example is that of British newspaper *Daily Telegraph*, which was accused of underreporting the tax scandals involving Swiss bank HSBC, one of its largest advertisers

(Plunkett and Quinn 2015). According to Peter Oborne, then *Telegraph*'s chief political commentator, the management had actively discouraged stories critical of HSBC since the bank suspended its advertising following a *Telegraph* investigation. Oborne reported that a former *Telegraph* executive defined HSBC as "the advertiser you literally cannot afford to offend" (https://www.theguardian.com/media/2015/feb/17/peter-oborne-telegraph-hsbc-coverage-fraud-readers).

[2] These nine manufacturers were involved in the top 100 recalls in terms of the number vehicles affected.

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

[4] 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.

[5] See Zhu (2019) for some details of motivations and impact of platforms' introduction of product tying.

[6] According to a report by *Advertising Age* on marketing research, three of the top 10 national advertisers in 2015 were car manufacturers, namely GM (#3), Ford (#6), and Fiat Chrysler Automobiles (#8).

[7] There are at least two reasons for recall letters not reaching owners. First, notices are only 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 also do 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.

[8] Each of the top 100 recalls concerned affected at least 680,000 vehicles with the mean number of potentially affected vehicles being about 1.4 million.

[9] These include Chrysler, Ford, General Motors, Honda, Hyundai, Kia, Nissan, Toyota, and Volkswagen and account for 87% of the market share as of 2015. See https://www.statista.com/statistics/249375/us-market-share-of-selected-automobile-manufacturers/ for more details.

[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 that mention recalls do not use the word "safety," almost all articles including a lengthy discussion of a recall use it.

[12] The same recall-related article can be included more than once in the data set if it contains the names of multiple manufacturers. This type of articles is not uncommon because sometimes 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*.

[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.

[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.

[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 in the online appendix.

[18] Note that a lot of these recalls are very small in terms of number of vehicles affected. Within the top 100 recalls, conditional on any recall being initiated in a given month, the median number of other recalls being initiated in the same month is zero, and there are two others being initiated at the 90th percentile.

[19] 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 in which it is has its headquarters. We then regress the monthly advertising expenditure by a manufacturer in a newspaper on the share of vehicles owned from 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.

[20] 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 data set on advertising in newspapers by car manufacturers.

[21] 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. Results available upon request.

[22] These are components that can lead to serious consequences if a defect occurs. Some examples of components that form the baseline category and, hence, are not classified as severe are latches/locks/doors, equipment (other), adaptive equipment, defroster/defogger system, seats, vehicle 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.

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

[24] In the online appendix, we present corresponding results for the intensive margin.

[25] We use the AFINN dictionary of negative and positive words to quantify the sentiment of the recall related articles.

[26] 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 Online Appendix D for details.

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

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

[29] As the next section illustrates, Craigslist had a significant effect on advertiser–newspaper relationships.

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

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

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

[33] The direct effect of advertising is insignificant because of the lack of time series variation as most Craigslist entry in cities happens by 2003–2004. Because the advertising spending variable is lagged two years, it is probable that this lack of variation explains the insignificance of the main effect. This also motivates us to limit the "preperiod" of the event study to at the most two years before Craigslist entry.

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

[35] 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.

[36] 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).

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