Product Positioning and Polarization in the Demand for Local News

Jason Zhao*

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Abstract

I study how local newspapers differentiate their news content, and how these editorial choices affect ideological segregation in news consumption. Specifically, I examine how firms position their products when Republicans and Democrats may differ in preferences for both ideologically slanted reporting as well as different topic coverage. To do so, I create a measure of partisan slant that separates politicized rhetoric from different topic selection between Democrats and Republicans. I use this measure to estimate a demand model in which Republican and Democratic consumers have separate, party-specific tastes for partisan slant and topic coverage. I find that consumers in both parties prefer partisan slant that favors their own ideological positions, with Democrats displaying a greater mean preference for like-minded slant. However, while Democrats prefer topic selection that mirrors that of major national papers, Republicans prefer more specialized reporting. I then model how firms choose slant and topic coverage in a simultaneous-move game. I show that because firms may differentiate over not just *how* but *what* they report on, policies aimed at limiting political slant in reporting are not sufficient to address polarization in news consumption. Moreover, I find in a counterfactual simulation that government subsidies promoting increased entry in local news may lead to both more extreme slant and increased ideological segregation in consumption.

*Northwestern Kellogg School of Management

1 Introduction

A 2020 Pew Research survey reveals a startling insight into America's political divisions: 85% of Americans believe that Republicans and Democrats have fundamentally different understandings of the basic facts regarding key issues, ranging from the safety of COVID-19 vaccinations to the legitimacy of the 2020 presidential election (Pew Research Center, 2020). Moreover, 80% think that this difference is driven by where Americans consume their news. What drives Republicans and Democrats to choose different news sources, leading to polarization in news consumption?

One potential reason is partisanship in news coverage. News outlets may ideologically slant their coverage to mix partisan rhetoric with factual reporting to favor a particular political position. For instance, Republican-aligned outlets may refer to "estate taxes" as "death taxes" (Gentzkow and Shapiro, 2010), and pro-Russian news sources may characterize military action in Ukraine as "reunification" rather than "annexation" (Simonov and Rao, 2022). Consumers may favor politically like-minded news outlets because they trust or prefer sources whose coverage skews towards their own viewpoints. A large body of work focuses on preferences for partisan slant as the primary dimension of horizontal differentiation among Republican and Democratic consumers.[1]

However, news outlets choose not only *how* to cover issues, but *which* issues to cover. Republicans and Democrats might prefer different news sources partially because these sources report more on topics that matter to them. If firms can differentiate horizontally over multiple aspects of news content, the degree of polarization in readership is not determined by political slant alone. Much of what we interpret as consumer demand for like-minded views may actually be driven by consumers differing in which issues they see as more important rather than consumers solely preferring different political viewpoints.

In this paper, I analyze the text of newspaper articles in order to measure two dimensions

[1] See Gentzkow et al. (2015) and Puglisi and Snyder (2015) for reviews of theoretical and empirical work, respectively.

of news reporting, partisan slant and topic coverage. I use these measures to estimate a structural model of demand for news consumption where consumers observe the ideological slant and topic coverage decisions of local newspapers and choose among the set of available options. Republicans and Democrats vary in their preferences for both slant and topic coverage, and I show that both attributes cause the two consumer segments to select into different news sources. I then estimate a supply-side model that allows me to predict how firms change their news reporting in response to recent policy efforts that proponents believe will decrease political polarization (Rebuild Local News, 2024). I find that, in contrast to this stated goal, such policies could lead to firms choosing to further differentiate their reporting, leading to both more extreme political slant and more polarization in news consumption.

To implement this model, I use text data to measure the topic coverage and ideological positioning of newspapers. First, in order to analyze partisanship in news coverage, I create a measure of ideological slant that compares the language used by Republican and Democratic congresspeople, while accounting for the fact that some of these differences are driven by which topics each party tends to discuss rather than by differences in politicized rhetoric. Existing metrics, such as those found in Gentzkow and Shapiro (2010) or Martin and Yurukoglu (2017), predict phrases to be indicative of political slant if they are used disproportionately by one party compared to the other. This approach means that even politically neutral phrases like "health care" or "public infrastructure" could appear ideologically slanted if the two parties differ in how often certain issues are mentioned in speeches.[2] To better separate partisan language from partisan differences in issue preferences, I adopt a machine learning approach that first assigns topic classifications to input text in order to use only *within-topic* differences in language to predict partisan ideology. I train the slant predictor on text from the Congressional record and then apply the trained model to news

[2]Another type of metric uses the self-reported political affiliations of consumers as a measure of ideological content in reporting. However, this framework doesn't take into account the degree to which other features may differentially attract Republican vs. Democratic consumers, a key focus of this paper. Other popular approaches look at the social media networks of reporters or the degree to which politicians in one party vs. the other are interviewed. However, these approaches also may conflate issue prominence and ideological content if Republican and Democrat politicians are invited to speak about different topics.

article text data from ProQuest in order to predict newspaper slant. This allows me to measure differences in ideological rhetoric that are not conflated with relative differences in the prevalence of certain issues or topics across parties.

Measuring how consumers respond to the topic coverage of newspapers is complicated by the fact that the importance of any given issue varies over time as different newsworthy events occur. For instance, news on political campaigns may be less valued by consumers further away from the election. As such, I quantify how consumers respond to differences in topic coverage by measuring the degree to which local newspapers deviate from the topic coverage choices of mainstream national newspapers. National newspapers' topic agendas serve as a reasonable baseline not only because national news coverage reflects changes to important current events but also because national outlets are widely available throughout the country. Thus, consumers' decisions should depend on the relative difference in topic coverage between local newspapers and national newspapers, which are available to local consumers as an outside option.

I use these measures to estimate a model of aggregate demand similar to that of Berry et al. (1995), where I also allow Democrats and Republicans to have separate preference distributions for ideological slant and newspapers' topic coverage. To estimate the model, I obtain data from the Alliance of Audited Media comprising zip code-level newspaper circulation data from 2020-2021. I supplement the circulation data with data on voting behavior and elected officials' ideology in order to describe the composition of consumers in each market. To address the fact that firms may choose to change their strategies in response to unobserved demand shocks, I construct instrumental variables in the vein of Fan (2013). These instruments take advantage of the partial-overlap of newspapers' markets. The characteristics of competitors' markets in which the focal firm does not operate should not be correlated with idiosyncratic demand shocks in the focal firm's markets, satisfying the exclusion criterion. However, these instruments are relevant in that these characteristics do affect competitors' reporting strategies, which then influence the focal firm's competitive re-

sponse. I construct instruments using additional data on various market characteristics, like demographic information and COVID-19 incidence, that may shift demand for competitors, affecting product positioning. I modify the standard BLP approach to allow for segment-specific demand parameters, and then use these instruments to estimate the model in the standard IV-GMM manner.

The central contribution of this paper is to show that partisan differences in the demand for news are not solely driven by demand for like-minded political viewpoints, but instead are also driven by differences in which issues Democrats and Republicans see as important. Consistent with the literature, I find that consumers in both parties prefer slanted reporting in line with their own beliefs. Relative to the average newspaper they encounter, Democrats would be willing to pay \$3.42 to receive a newspaper that is one standard deviation closer to their ideal political slant. For Republicans, the analogous figure is \$1.27. However, I also show that the two consumer segments differ in their preferences over issue coverage. Democrats prefer topic coverage that mirrors the national newspapers, while Republicans prefer more specialized coverage that differs from the agenda of major national papers. A one standard deviation increase in topic similarity to national newspapers is equivalent to a \$1.44 price decrease for Democrats or a \$0.99 *increase* for Republicans. This preference for specialization is not driven by the comparisons to national news outlets, which are often assumed to be left-leaning. Republicans still prefer specialization in topic coverage even in an alternate specification where I compare topic coverage to that of the average Republican-leaning local paper.[3] Because Democrats and Republicans differ both in terms of what issues they would like to learn about as well as how they would like to see those issues covered, firms can horizontally differentiate over both dimensions of news content.

This finding diverges from previous work that conceptualizes the firm's decision in a Hotelling-like framework, where firms differentiate over a one-dimensional construct of "bias" (Mullainathan and Shleifer, 2005; Gal-Or et al., 2012; Gentzkow et al., 2014). Since firms can

[3]See Appendix C for more details.

differentiate news coverage over two dimensions, ideological slant and topic coverage, the relationship between ideological content and polarization in media consumption becomes more complex. For instance, a newspaper further slanting its coverage to favor the Republican party can actually make consumption *less* polarized if its topic coverage strategy is tailored toward the issues that Democrats think are more important.

Turning to the supply side, I model how firms differentiate their news content in a simultaneous-move product positioning game. I formulate each firm's objective function given both costs that depend on the chosen product characteristics as well as the strategies of its competitors. Using the demand estimates, I numerically approximate the gradients of the objective functions in order to back out the costs implied by the firm's first order conditions. I then simulate how firms' Nash equilibrium slant and topic coverage strategies change under counterfactual scenarios. I show that the fact that firms can horizontally differentiate over multiple dimensions complicates the relationship between ideological content and polarization in consumption. Even if firms employed only neutral slant, profit-maximizing firms may choose to differentiate more on topic coverage. Thus, the impact of any change in political slant on partisan demand for news also depends on the topic coverage chosen in equilibrium.

Finally, I explore the potential impact of commonly proposed policy solutions on firms' reporting decisions and on polarization in news consumption. Many state and local legislatures have made efforts to subsidize or revitalize local news outlets, with the goal of increasing the number of available local news options (Rebuild Local News, 2024). I simulate how incumbent newspapers in New Mexico change their reporting strategies when a new firm enters in the same market as the largest newspaper. I predict the resulting changes to topic coverage and the intensity of political slant, as well as the changes to the political composition of readers for each newspaper. Although proponents for such legislation often cite decreasing political polarization as a motivating goal for these subsidies, I find in the simulation that incumbent newspapers respond by choosing more extreme product position-

ing, resulting in more polarized readership. These findings suggest that policymakers must consider whether other potential benefits of these policies outweigh these potential increases in slanted reporting and polarized news consumption.

This paper contributes to three bodies of literature. First, I contribute to work on partisanship and ideological content in news media. Prior work typically thinks of political bias as the main dimension of horizontal differentiation in the news. In fact, political slant and ideological segregation in news consumption are so intertwined as concepts that some studies use polarized news consumption as a *measure* of ideological bias (Flaxman et al., 2016), without considering that other factors might drive Republicans and Democrats to different news sources. Much of the literature examines how consumer demand responds to the ideological content of news without controlling for differences in topic selection (Gal-Or et al., 2012; Gentzkow et al., 2014; Martin and Yurukoglu, 2017; Martin and McCrain, 2019). To the degree that the literature examines differences in topic selection, topic selection is usually thought of as an alternate way to measure the ideological position of news outlets (Larcinese et al., 2011; Puglisi, 2011; Qin et al., 2018; Hassell et al., 2020). In contrast, Simonov and Rao (2022) separately measures both slanted rhetoric and topic coverage in order to allow slant to moderate consumers' preferences for news coverage on politically-sensitive topics, like protests and corruption. Compared to this prior literature, I consider whether consumers have preferences for general differences in topic coverage independently of ideological content, rather than solely focusing on how much firms cover issues that are politically-sensitive or favor a certain political entity. More importantly, I show that these preferences are different for Republicans and Democrats, implying that part of what we attribute to preferences for politically like-minded news may actually be due to differences in which issues are important to consumers in each party.

I also contribute to the literature on ideological segregation in news consumption. Much of the recent literature places a strong focus on online news and social media, as well as how online platforms may worsen polarized consumption (Gentzkow and Shapiro, 2011;

Flaxman et al., 2016; Guess, 2021). These studies document the degree of polarization in news consumption by matching consumption behavior to self-reported ideology. In this paper, I provide evidence on the degree of polarized news consumption for local newspapers, which are not only perceived as more trustworthy by consumers (Pew Research Center, 2022) but are also the focus of ongoing policy efforts. Moreover, I estimate a structural model which allows me to characterize polarized consumption without directly observing the political affiliations of consumers. The model also allows me to simulate how different counterfactual scenarios impact firms' positioning strategies and subsequently the degree of ideological segregation in consumption.

Finally, my work builds on the empirical literature on product positioning in differentiated product markets. A number of studies investigate how firms' product choices and levels of product differentiation vary with changes to competition (Draganska et al., 2009; Fan, 2013; Orhun et al., 2016; Seim, 2006; Thomadsen, 2007). Fan (2013) is the most similar to this study as the author also models newspapers' endogenous choices of product characteristics like content variety, local news content and a quality index. I build on this literature first by modeling a market where firms face different consumer segments that have different distributions of preferences over the product characteristics. Second, my context is one in which the actual product choices of firms, as well as the degree of market segmentation, carry normative concerns. Increased differentiation in the dimension of partisan slant can be seen as normatively undesirable if policymakers consider slanted language to be distortions of the truth, in that opinionated or subjective ideas may be presented as factual. Likewise, regulators may be concerned if changes to the competitive environment or to public policy lead to more polarized consumption, with Republicans and Democrats self-segregating into different news sources. In this way my work also informs research on other markets where firms' product choices carry normative concerns, such as in nutrition (Allcott et al., 2019; Alé-Chilet and Moshary, 2022; Seiler et al., 2021) or tobacco usage (Tuchman, 2019; Wang et al., 2016).

The rest of the paper is organized as follows. Section 2 describes the data and dataset construction. Section 3 describes the structural model while Section 4 details the estimation strategy and parameter estimates. Section 5 examines changes to product positioning and polarized news consumption under different counterfactual scenarios. Section 6 concludes.

2 Data

In order to estimate the choice model I combine several types of data: 1) data on newspaper circulation, 2) text data used to construct measures of news content and 3) market-level data on consumer characteristics.

2.1 Circulation Data

I obtain aggregate data on newspaper circulation and pricing from 2020-2021 from the Alliance of Audited Media (AAM). These data are a combination of self-reported circulation numbers as well as audits conducted by AAM, and include both total circulation as well as per-issue (cover) pricing by edition. Observations are at the zip code-quarter-day of week level. Since not all days of the week are reported by all newspapers, I further aggregate observations to weekday and weekend edition averages to facilitate comparisons across newspapers. I include all daily newspapers for which both circulation data from AAM and article text data from ProQuest are both available.

Figure 1 illustrates the geographic distribution of the newspapers in my sample. The main specification sample comprises 95 papers and 112,678 observations. The data mirrors a common concern: the majority of markets are served by only one local paper.[4] In terms of geographic representation, there is some over-representation of the Midwest. Note that some states in New England and the Mountain region are excluded because of data construction concerns associated with constructing political ideal points, as detailed in Section 2.3.

[4] Although some papers are dropped in my sample due to the lack of available data on article content, it is still true that most markets are served by one paper even without dropping these papers.

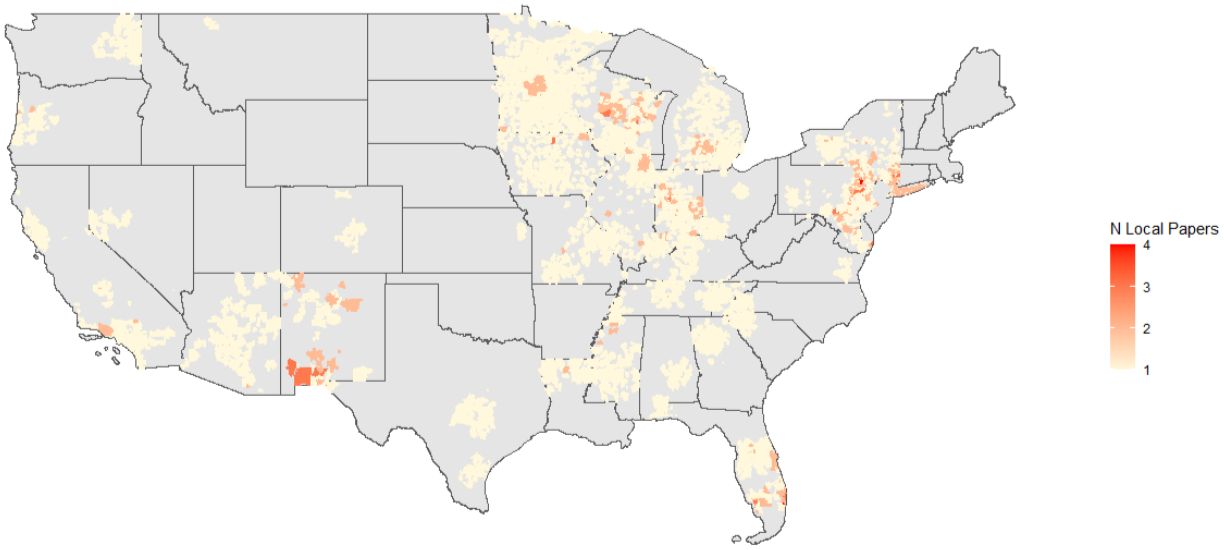


Figure 1: Number of Local Papers in Main Sample by Zip Code Tabulation Area

2.2 Text Measures of News Content

In order to characterize consumer demand for different aspects of news content, I take a natural language processing approach to create two scalar measures of news coverage. First, I create a measure of topic coverage which quantifies the degree to which a local paper deviates from the topic coverage of national newspapers. Second, I create a measure of ideological slant that measures the degree of partisan rhetoric employed in reporting.

To do so, I obtain article-level text data from ProQuest TDM Studios. Specifically, I obtain full article text and topic classifications for general interest daily newspapers from 2020-2021. These topic classifications are generated from a combination of machine-labeling and manual oversight. The granularity of these topic tags is on the level of "State court decisions" or "Murders and murder attempts", as opposed to specific court cases or specific crimes, but even still there are hundreds of categories to which articles may be assigned.

To keep the text analysis tractable, I slightly reduce the dimensionality of the topic space. I first combine all topic tags if their intersection in the set of articles comprises at least 75%

of the articles associated with the less-frequent tag. This combines tags like "COVID-19" and "Coronaviruses" that are considered distinct by the data provider but are substantively quite similar. Then, for each sample year I treat the top 50 topics as the universe of possible topics for categorization.

I supplement these data on article text and classifications with Congressional transcripts from the Congressional Record. These transcripts include the text of speeches made in Congress as well as the associated speaker.

In the following subsections, I provide more details in how I construct these news content measures from these text data.

2.2.1 Measuring Issue Coverage

While ProQuest provides labels for the topics covered by each article in the data, a major challenge is that consumer preferences for a specific category of issues is not stable. The nature of the news industry is that certain issues or topics will be more or less important at different points in time. That is, it is not meaningful to assume the same consumer preferences for, say, "political campaigns" in an election year compared to a non-election year. Further, estimating distinct preference parameters for more than 50 topics would be computationally quite difficult.

I instead compare the overall selection of issues for each local paper to a common baseline: the mainstream national daily newspapers. National newspapers' coverage reflect the fact that different topics and issues become more important according to changes to current events. Moreover, these national newspapers are widely available throughout the country—in examining demand for local news, the national papers can be thought of as consumers' outside option. In this sense, it is the relative difference in topic coverage between local and national papers that matters. Thus, deviations from national news agendas is a reasonable, tractable way to measure how local newspapers differentiate their topic coverage. My sample contains article text for three national papers: the New York Times, USA Today and the

Washington Post.[5]

For each newspaper-quarter, I construct a 50-dimensional vector of topic loadings, where each element is the percentage of articles tagged with a particular topic. I calculate the cosine similarity between the topic vector of each local paper with the centroid of the analogous vectors for the national papers. This measures the degree to which a local newspaper specializes in topic coverage as opposed to selecting issues to mirror the agendas of national papers.

Figure 2 displays the distribution of local newspapers' topic coverage decisions. The bulk of newspapers closely follow the topic agendas of national newspapers, with the mean newspaper having a cosine similarity of 0.9 in topic coverage as compared to the national newspapers. Some newspapers, however, do choose to specialize more in selecting which topics to cover.

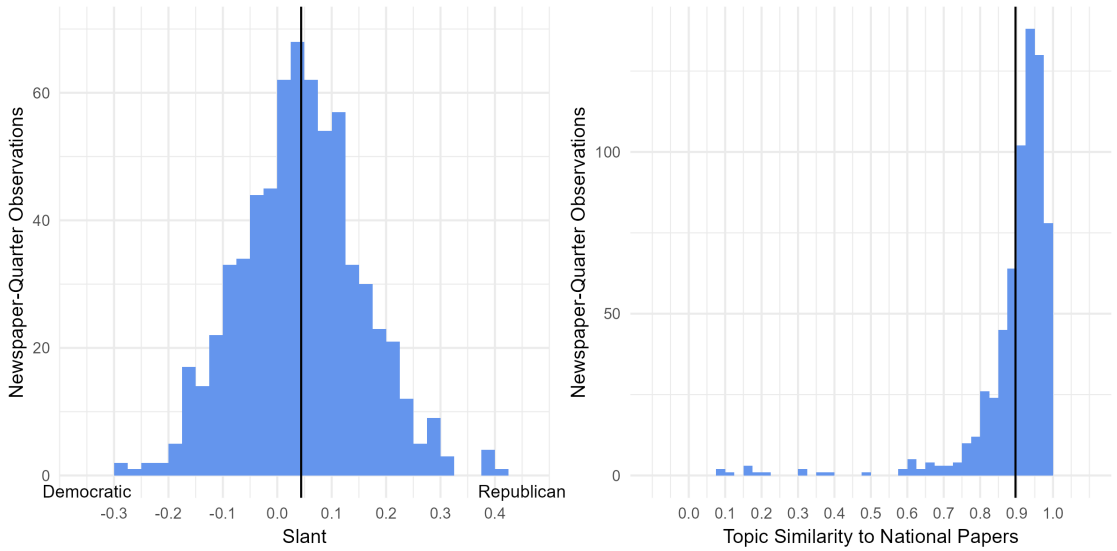
Importantly, this measure quantifies how much papers follow the overall agendas of national news but not the split between national and local reporting. For a simple example, suppose the national papers all split reporting 50/50 on political campaigns and COVID-19. If a local paper has the same split in issue coverage, I consider the paper to have issue coverage exactly mirroring national papers, even if the paper only covers municipal political campaigns and local COVID-19 incidence.

2.2.2 Measuring Slant

To create a text-based measure of partisan slant, I predict the ideological slant of newspapers by comparing the rhetoric used in articles to that of the speeches of Republican and Democratic politicians. Thus, in addition to the article data from ProQuest described in Section 2.2.1, I use speeches from the Congressional Record retrieved using the govinfo API

[5]One concern may be that national newspapers are often perceived to be left-leaning, though I measure these papers' political slant to be fairly centrist. However, results are robust to an alternate specification where I compare topic coverage to only similarly-slanted newspapers. In this specification, I take a median split of newspapers by measured political slant. For Republicans I measure preferences relative to the average topic coverage of the more conservative papers. The process for Democrats is analogous. Estimates and further discussion can be found in Appendix Section C.

Figure 2: Distributions of Slant and Topic Coverage by Newspaper-Quarter



Left panel displays the distribution of measured slant, where positive slant indicates more Republican and negative more Democratic. Right panel displays distribution of topic coverage similarity between the focal local newspaper and the average of the national newspapers, where 1 is identical topic coverage. Each observation is one newspaper-quarter.

as well as data on Congressional members' ideology from Voteview (Boche et al., 2018).

To construct the slant metric, I use a machine-learning approach that takes as input a body of text and outputs a predicted ideology score. The overall procedure is as follows. First, I train the predictor using speeches from the Congressional Record and (observed) ideology scores of Congressional members. I then use the trained predictor to predict local newspaper ideology based on newspaper article text. Conceptually, the metric predicts how conservative or liberal a politician would be if she used similar language as is used by the newspaper.

Compared to previously used metrics like in Gentzkow and Shapiro (2010) or Martin and Yurukoglu (2017), I construct my slant metric to measure only differences in partisan slant that is attributable solely to differences in language rather than differing prevalence of subject matter in speeches. That is, I seek to measure ideological slant by comparing differences in language across parties only after conditioning for the topic at hand.

To illustrate the importance of this distinction, consider two examples. First, some

relatively politically neutral phrases are used more by one party because they are more likely to discuss certain topics. For instance, Democrats are overall 2.8 times more likely than Republicans to use the phrase "sexual assault" in a speech. However, much of this difference in usage is actually due to the fact that Democrats are much more likely to discuss issues relating to sex crimes in Congress. When looking only at speeches categorized as relating to sex crimes, Democrats are only 1.4 times more likely to use the phrase "sexual assault." Second, some phrases are only ideologically slanted in specific contexts. Ignoring topic selection, Democrats are only 1.03 times more likely to use the phrase "national security" overall, but there are stark partisan differences in usage in regards to specific issues. In speeches on the topic of social media, Democrats are 11.4 times more likely to bring up the phrase "national security". Without controlling for the topic of the speech, a slant predictor may mistakenly perceive neutral phrases as slanted and miss context-specific slanted rhetoric. Taking into account the topic of speeches addresses both of these issues.

Training the predictor entails two steps. First, I must classify each input text so as to determine the topic of the speech. Second, I then look at within-topic differences in language usage to predict each Congressional member's ideology score from the rhetoric used in their speeches.

In order to classify speeches, I train a topic classifier using the newspaper article topic tags in the ProQuest data. I narrow down the universe of possible topics to the 50 most frequently-occurring tags in each year. I then train a classifier using FastText (Joulin et al., 2017) to predict which of these 50 topics most closely matches any input text from the Congressional Record.[6] I keep speeches if the probability that the selected label is the best among all 50 labels is at least 0.5.

Similarly to Martin and Yurukoglu (2017), I use the classified Congressional speeches to predict dimension 1 of the DW-NOMINATE score of each Congressional member (Poole and Rosenthal, 2017; Boche et al., 2018). This score is an ideology measure based on roll-call vot-

[6]Standard text pre-processing is applied before classification: I remove number and stop words, and I also stem word variants to their common roots.

ing with support from -1 (very Democratic) to 1 (very Republican). For each Congressperson-year, I calculate the TF-IDF frequency measure for each bigram, relative only to speeches belonging to the same topic. I retain as features the TF-IDF scores of the 2000 bigram-topic pairs with that are most disproportionately used by one party, as determined by the χ^2 statistic of Gentzkow and Shapiro (2010). This is simply Pearson's χ^2 statistic where the null hypothesis is that the phrase is equally likely to be used by both parties. I use these features to train an XGBoost regression predicting the DW-NOMINATE ideology of each Congressperson.[7]

Finally, I calculate analogous TF-IDF measures of these bigram-topic features for each newspaper-quarter and use the trained XGBoost predictor to predict a quarterly slant metric for each local newspaper in the sample. Table 1 displays the phrases most predictive of ideology according to the fitted model. Note that this implies a different criterion for selecting partisan phrases compared to the chi-square statistic from Gentzkow and Shapiro (2010), where the authors consider phrases most disproportionately used by one party as the "most partisan." Here, the "most partisan" phrases are those that are most predictive of a *continuous* measure of ideology, and may predict differences between politicians within the same party.

Overall, COVID-19 and law enforcement are speech topics that use the most partisan rhetoric. The most partisan phrase under my preferred slant metric is "wish list" in reference to Republican criticisms regarding governmental overreach in COVID-19 aid bills. The most predictive Democratic phrase shows that Democrats are particularly likely to discuss differential impacts of COVID-19 across social groups, with "commun[ities of] color." The law enforcement features show that Republicans disproportionately place focus on the officers themselves, with features like "enforc[ement] offic[er]" as well as "men [and] women" (usually part of phrases like "brave men and women") who put their "live[s on the] line".

[7]In addition to standard pre-processing, I also remove phrases that are either likely to lead to noisy predictions due to low sample size, or predictive in the Congressional records but not in other contexts. These include phrase-topic pairs used fewer than 50 or more than 10,000 times, full names of presidents and state names, as well as topic categories mentioned in fewer than 100 speeches in either party.

Table 1: Phrases Most Predictive of Partisanship

Rank	Phrase	Topic	Party	Rank Ignoring Topic Selection
1	wish list	COVID-19	R	7
2	illeg immigr	COVID-19	R	3
3	men women	Law enforcement	R	-
4	vaccin mandat	COVID-19	R	-
5	defund polic	Law enforcement	R	9
6	democrat colleagu	COVID-19	R	1
7	commun color	COVID-19	D	18
8	enforc offic	Law enforcement	R	44
9	american peopl	COVID-19	R	-
10	legisl day	COVID-19	D	31
11	text bill	COVID-19	D	180
12	oper warp	COVID-19	R	123
13	american rescu	COVID-19	D	34
14	hero act	COVID-19	D	305
15	anoth trillion	COVID-19	R	27
16	afford care	COVID-19	D	81
17	southern border	Law enforcement	R	8
18	local govern	COVID-19	D	185
19	live line	Law enforcement	R	-
20	warp speed	COVID-19	R	22

Table displays the phrases that are most predictive of partisan ideology. Phrases are ranked by XGBoost feature importance. The "Party" column indicates whether the phrase is more commonly used by Republicans (R) or Democrats (D). "Rank Ignoring Topic Selection" refers to the feature importance rank when using an alternate metric that looks only at overall differences in phrase usage. Dashes indicate phrases not selected as features by the alternate metric. Word variants are stemmed to common roots.

Table 1 also shows how accounting for differences in topic selection changes which phrases are predictive of ideology. The last column displays the importance rank of each of these phrases in an alternate metric that ignores differences in topic prevalence. Many of the most predictive phrases are disproportionately used by one party regardless of topic, in contrast to the earlier example of "national security". However, when conditioning on the topic of the speech, the preferred method finds more predictive power in many features that are far less predictive when ignoring topic selection.

Moreover, the preferred metric may also aid in generalizability when applying the predictor to text inputs outside of the Congressional Record. Topic selection differs not just between Democratic and Republican politicians, but between politicians and newspapers. For example, local newspapers may be more likely overall to discuss issues relating to "local govern[ment]" which could erroneously lead to predicting excessively Democratic slant when ignoring topic selection. Controlling for topic selection ensures that it is only the more politicized discussion of the role of local government in (not) addressing COVID-19 that contributes to measured slant.

Figure 2 illustrates the distribution of the measured newspaper slant. Recall that the support for the slant metric is [-1,1], where more positive is more Republican. Most newspapers employ relatively moderate slant, with the mean slant being slightly Republican-leaning at 0.04.

2.3 Consumer Characteristics

Next, I obtain data that describes the political affiliation and ideology of consumers in each market. I match each observation to presidential vote-shares, which I use to proxy for the distribution of Democratic and Republican consumers, as well as the political ideology of each market's Congressional representatives, which I use to construct political ideal points. I obtain zip code-level estimates of the 2020 presidential vote shares from the American Ideology Project (Warshaw and Tausanovitch, 2022). I match zip codes to Congressional

districts using data from OpenSourceActivismTech (Levinger, 2022). I then match each Congressperson to their DW-NOMINATE dimension 1 ideology score, obtained from Voteview (Boche et al., 2018). The DW-NOMINATE score is commonly used in the Political Science literature and uses roll-call voting to map politicians' ideology on a scale from -1 to 1, where -1 indicates liberal ideology and 1 conservative.

For a given Congressional district, I construct political ideal points separately for Democrats and Republicans as follows. Suppose the Congressperson representing the focal district is a Democrat, then I assume the Democratic ideal point is the DW-NOMINATE score of that Congressperson. Since the district only has one elected Congressperson, I would then construct the Republican ideal point as the average of all Republican Congressional members in the state. In my preferred specification, I include only states with both parties represented in Congress. All results are robust to an alternate specification where, for one-party states, I use the most moderate state average for the minority party ideal points. Results are also robust to a specification where I use only state-level averages for all consumers.

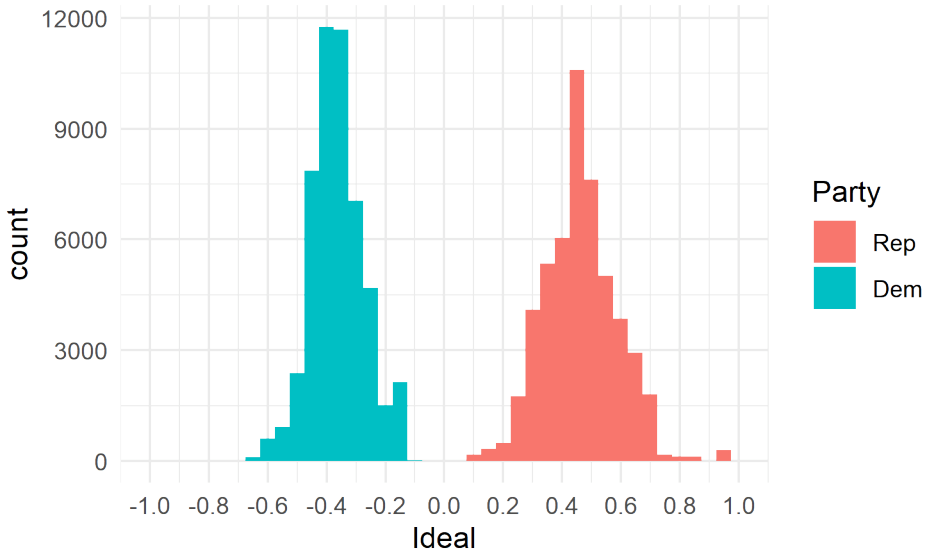
Figure 3 plots the distribution of Democratic and Republican ideal points by zip code-quarter. Compared to the distribution of observed newspaper slant, which tended to be between -0.3 and 0.4, the distribution of ideal points is wider.

Finally, I use data on market characteristics to construct instruments as described in 4.1. These data consist of zip code tabulation area (ZCTA) level census data from the Census Bureau, religiosity data from the US Religion Census, as well as county-level COVID-19 incidence data from the CDC. The census data are purely cross-sectional, from the 2020 census. The CDC COVID-19 data are an unbalanced panel, which I aggregate to semi-annual averages to allow for more consistency across geographic areas.

2.4 Model Free Evidence

Figures 4 and 5 show basic correlations between ideal points and the product characteristics of interest. Each point represents one newspaper. The X-axis measures the population-

Figure 3: Distribution of Ideal Points by ZCTA-Quarter



Histogram displays the distribution of measured ideal points, where each observation is zip code-quarter-party. Ideal points are based on DW-NOMINATE score of the zip code's Congressional representative for the majority party. For the minority party, the ideal point uses the state average of the appropriate party's Congressional members.

weighted average ideal points over each paper's respective market. That is, I calculate the average ideal point according to the following:

$$AvgIdeal_j = \frac{\sum_t \sum_{zt \in Z_{jt}} (Vote_z^D * Ideal_{zt}^D + Vote_z^R * Ideal_{zt}^R) * HH_{zt}}{\sum_t \sum_{z \in Z_{jt}} HH_{zt}} \quad (1)$$

where Z_{jt} denotes the zip code markets where j is operating at time t, $Vote_z^D$ is the Democratic vote share of z in the 2020 presidential election, $Ideal_{zt}^D$ is the ideal point as described in Section 2.3, and HH_{zt} is the number of households in z at time t. The Y-axis shows the average characteristic, either slant or topic similarity, over 2020-2021 for each newspaper. Note that since I plot the average choices across two years for these newspapers, the observed range of choices in the data is somewhat wider than what is shown.

There is a positive correlation between the market's ideal point and the firm's chosen ideological slant position, which should be unsurprising. However, Figure 4 shows that this correlation is not especially strong, with many firms exhibiting slant that is either more

Figure 4: Average Publication Slant vs. Market Average Ideal Point

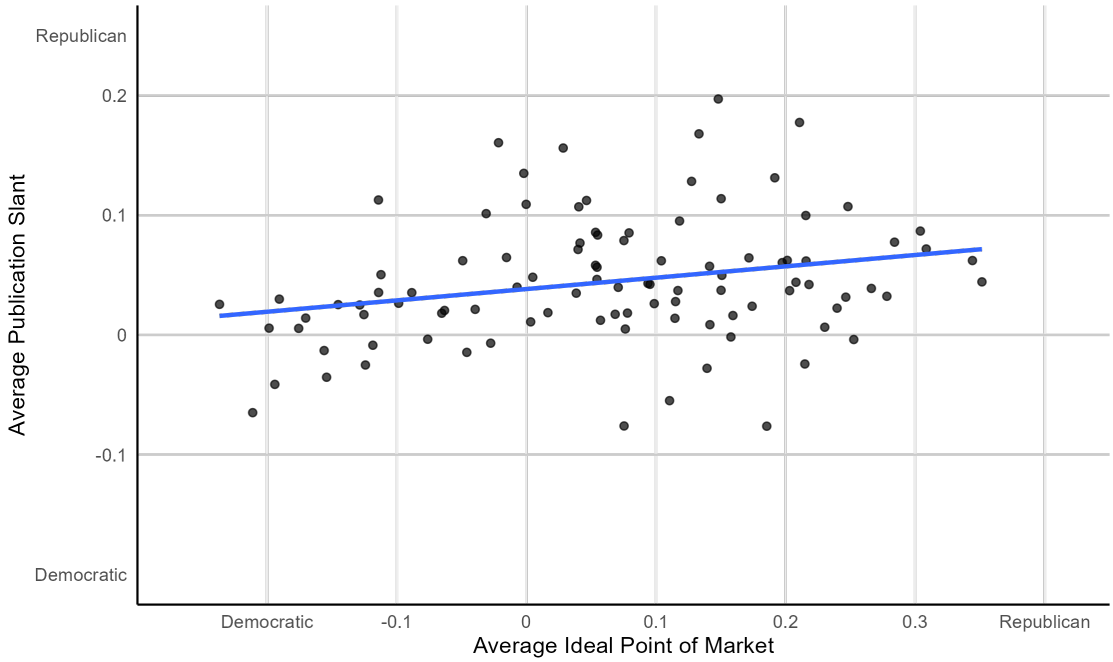


Figure displays the correlation between the newspaper's average measured slant and the population-weighted average ideal point of all the markets where the paper is available. Pearson's correlation is 0.24 with p-value = 0.018.

Figure 5: Average Publication Topic Coverage vs. Market Average Ideal Point

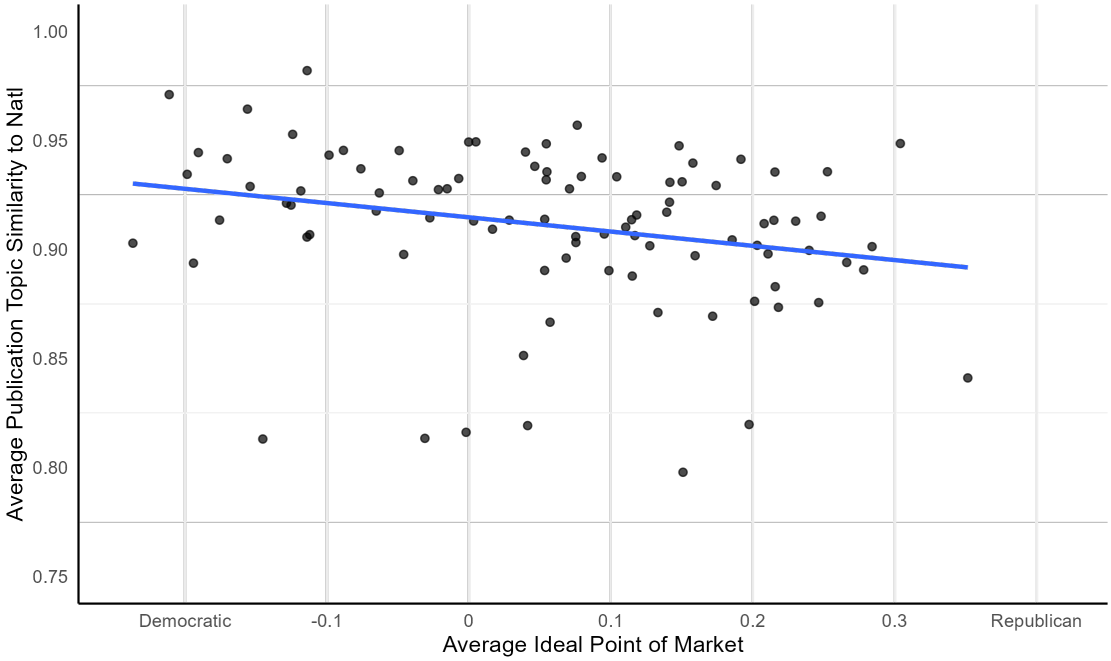


Figure displays the correlation between the newspaper's average topic similarity to national papers and the population-weighted average ideal point of all the markets where the paper is available. Pearson's correlation is -0.29 with p-value = 0.004.

liberal or more conservative than the average consumer in their market.

Figure 5 shows that newspapers in more Republican areas tend to deviate more from mainstream national newspapers' topic coverage. For ease of viewing, this figure excludes the 5% of newspapers whose topic coverage choices are most specialized. Recent polling finds evidence that aligns with this correlation in the data. Republicans are less likely to trust their news sources they see as "mainstream", whereas Democrats are more likely.[8] These data suggest that the undesirability of "mainstream" sources may be due partially to topic selection rather than solely to the ideological positioning of national newspapers.

The structural model estimates will more precisely quantify these patterns in the data. I describe the model setup in the following section.

[8]https://www.pewresearch.org/short-reads/2021/07/01/republicans-less-likely-to-trust-their-main-news-source-if-they-see-it-as-mainstream-democrats-more-likely/

3 Model

3.1 Demand

Each period, each consumer observes the product characteristics of the available local newspapers and either chooses to purchase one or to consume the outside option.[9] I consider a local paper-edition to be among the options in a consumer's choice set if, during the time period, the paper-edition is circulated anywhere in the consumer's county.

I model two types of consumers in each market: Republicans and Democrats, each with distinct preferences for news content. Each consumer segment has separate preference parameters over the degree of partisan slant in the language of each paper and the similarity between the paper's issue coverage to the issue coverage of national papers. Consumers in each segment share preferences over the distance between a paper's ideology and their ideal points, but vary by zip-code in their ideal points as described in section 2.1. I allow Republicans and Democrats to have different distributions of heterogeneity over preference parameters for both slant and issue coverage. Both consumer segments have identical, homogeneous preferences over prices and exogenous characteristics of newspapers, like the distance between the newspaper's home market and the consumer's market, as well as non-varying characteristics that are absorbed into fixed effects.

Formally, let purchase utility of the $e \in \{weekday, weekend\}$ edition of newspaper j by consumer i in zip code z in quarter t be given by:

$$u_{iejt} = \pi_i^S (slant_{jt} - ideal_i)^2 + \pi_i^T topicSim_{jt} + \beta^{ex} \mathbf{X}_{ejzt} + \alpha p_{ejt} + \Delta\xi_{ejzt} + \varepsilon_{eijt} \qquad (2)$$

The parameters of interest, π_i^S and π_i^T, are random coefficients governing tastes for slant and topic coverage, respectively. Individual preferences are distributed according to party-specific distributions. Suppose consumer i belongs to party $P \in \{Republican, Democrat\}$.

[9] Fan (2013) allows for consumers to choose up to two different inside goods. In my setting, the number of local newspapers has decreased markedly, and the majority of markets only has access to one local newspaper, so I do not model multiple purchases.

The random coefficients are distributed according to:

$$\pi^S_{i\in P} = \bar{\pi}^S_P + \nu^S_P, \text{ where } \nu^S_P \sim N(0, \sigma^S_P), \text{ for } P \in \{Republican, Democrat\} \tag{3}$$

$$\pi^T_{i\in P} = \bar{\pi}^T_P + \nu^T_P \text{ where } \nu^T_P \sim N(0, \sigma^T_P), \text{ for } P \in \{Republican, Democrat\} \tag{4}$$

In addition, $\mathbf{X}^{ex}_{ejzt}$ is a matrix of exogenous newspaper characteristics including paper-edition, zip code and quarter fixed effects as well as the number of miles between the centroid of the county corresponding to z and that of the home zip code for paper-edition j, and an indicator variable for whether the consumer resides in the paper's home county.[10] Moreover, p_{ejt} is the per-copy price, $slant_{jt}$ is quarterly newspaper slant as defined in Section 2.2.2, $ideal_i$ is the consumer's ideal point, which is defined at the market-party level as described in Section 2.1, and $TopicSim_{jt}$ is the (de-meaned) quarterly topic similarity between the focal paper and the national papers as defined in Section 2.2.1. Moreover, $\Delta\xi_{jzt}$ is the market and period-specific idiosyncratic taste shock for paper-edition j that is observed by the firm and consumer but not by the researcher, and the Δ signifies that this shock is what remains after absorbing the fixed effects. Finally, ε_{ijt} is an individual-specific random taste shock which is assumed to be distributed Type I Extreme Value.

Given the utility function in Equation (3.1), we can define the market share for edition e of paper j during t in the ZCTA z as the following:

$$s_{ejtz}(\pi, \alpha, \beta^{\mathbf{ex}}, \sigma; \mathbf{slant_t}, \mathbf{topicSim_t}, \mathbf{X_t}, \mathbf{p_t}) = \int\int \frac{\exp(v_{eijt})}{1 + \sum_k \exp(v_{eikt})} dF(\nu|\sigma, P) dG(P) \tag{5}$$

where v_{eijt} denotes the utility less the ε_{eijt} shock, F is the distribution of the random coefficients, and G is the distribution of Republican and Democratic consumers in the market.

[10] I define the home county as the county with the highest circulation of the focal paper.

3.2 Supply Model

The primary goal of the supply model is to be able to characterize firms' equilibrium profit-maximizing slant and topic coverage strategies in a simultaneous game. Each period, firms choose the level of partisan slant and the degree of similarity between their own topic coverage and the national topic agenda. Each firm observes the strategies of its competitors and knows both the composition of consumers in its competitors' markets and the costs that competitors face. I assume that firms choose the same slant and topic coverage for both weekend and weekday editions.[11] Additionally, I consider both the markets in which firms operate and characteristics absorbed into fixed effects (such as fixed characteristics relating to quality) to be exogenous and determined before the start of the game. Finally, I do not model changes to pricing in the game as I do not observe price to vary at the same granularity as the newspaper content, and there is relatively little variation in prices in the data. In this way, we can also think of the problem as being the newspaper editor's problem rather than the firm owner's problem, since the editor optimizes the content of the paper's articles but may not have the ability to affect prices or quality investments in the short term.

Moreover, I assume firms choose reporting strategies to maximize immediate profits and do not have non-pecuniary motivations for either slanting coverage or for achieving any certain composition of readers. The assumption that firms are profit-maximizing is non-trivial, but serves an important baseline to which we may make comparison. In practice, much existing literature seeks to investigate whether firms have non-pecuniary political motives to provide favorable coverage to one political party over the other. Instead, I will show that even if firms do not have political motives, they may choose to slant coverage or otherwise choose product characteristics that result in polarized readerships.

Due to data limitations, I make some further simplifying assumptions when considering

[11] This is reasonable to the degree weekend editions sometimes serve as summaries of the week's news. Moreover, this better reflects the data used to estimate the model as measuring slant for just the weekend edition articles each quarter tends to add considerable noise to the measurement. However, I still separate out weekday and weekend demand as choice sets differ depending on the day of the week. Additionally demand is generally higher for weekend editions, but not all newspapers have weekend editions.

firm profits. First, I assume that firms seek to maximize sales revenue less costs. Ideally, I would be able to model how firms' reporting choices impact advertising revenue as well, but I do not observe advertising rates or advertising sales for the vast majority of papers in my final sample.[12] Likewise, with ideal data, I would explicitly model marginal costs, but I do not observe data on production inputs. However, since advertising revenue is likely to be weakly increasing in circulation and marginal costs are unlikely to exceed the per-issue price, the firm's simplified objective is likely to be highly correlated with true profits. Further, if we conceptualize the firm's problem as the editor's problem rather than the owner's problem, the editor of the newspaper may not have much input in determining pricing, advertising sales, or other decisions that would relate to marginal costs.

Second, I assume that sales revenue is the simple product of circulation and the cover price of each paper as I do not observe subscription pricing or the percentage of circulation that is subscription as opposed to retail. This mostly affects the model in terms of the scaling for fixed costs, since I do not model the firm's pricing decisions in the counterfactual simulations.

Specifically, the firm's problem is the following:

$$\max_{slant_{jt}, topicSim_{jt}} \frac{1}{\sum w_e} \sum_e w_e * p_{ejt} * HH_{ejt} * s_{ejt}(\mathbf{slant_t}, \mathbf{topicSim_t}) \\ - [FC_j(slant_{jt}) + FC_j(topicSim_{jt})] \tag{6}$$

where e denotes either the weekend or weekday edition,[13] the circulation-weight w_e is 5/7 for $e = weekday$ and 2/7 if $e = weekend$, HH_{ejt} denotes the size of the market faced by the firm for each paper edition. I abuse notation slightly to highlight that the market share, s_{ejt}, takes the demand parameters as given in the supply model but allow the shares to depend on the vectors of slant and topic choices of all the player firms, $\mathbf{slant_t}$ and $\mathbf{topicSim_t}$. Finally,

[12] I find that the intersection between firms included in the ProQuest text data and firms represented in the Editor and Publisher data used by Fan (2013) is quite small.

[13] Note that not all newspapers have both a weekday and weekend edition.

$FC_j(.)$ is the fixed cost function for firm j. These costs do not vary in quantity sold but do vary in the characteristics chosen by the firm.

In the absence of strong theoretical guidance as to the functional form of the costs of providing different news content, I follow (Fan, 2013) in specifying costs as a polynomial function of the product characteristics. However, I allow for some additional flexibility in costs by using a cubic cost function rather than a quadratic, and by allowing the size of the paper to scale these costs. I proxy for the overall size of the newspaper using the total number of articles written per period. I assume the number of articles written to be exogenous.

I back out the fixed costs from the firm's first order conditions, so only the slope of the fixed cost function is identified. I parameterize the slope of the fixed cost function with respect to each dimension of newspaper reporting $d_{jt} \in \{slant_{jt}, topicSim_{jt}\}$ as the following:

$$FC'(d_{jt}) = \gamma_0^d + \gamma_1^d d_{jt} * log(articles_{jt}) + \gamma_2^d d_{jt}^2 * log(articles_{jt}) + \eta_{jt} \tag{7}$$

where $articles_{jt}$ is the number of articles written in period t and η_{jt} is an unobservable cost shock. I provide further details about how I estimate these cost parameters in the following section.

4 Estimation and Results

The quantities to be estimated are the demand-side utility parameters and the supply-side fixed cost parameters. Due to the additional assumptions needed to address data limitations in the supply-side model, I estimate the demand and supply sides of the model sequentially, using demand-side estimates to then estimate the fixed cost functions, rather than jointly. The demand-side parameters are estimated analogously to Berry et al. (1995), henceforth BLP. After obtaining demand-side parameters, I can then estimate the fixed cost parameters implied by the first order conditions of the firm's problem in (3.2).

In this section, I first discuss endogeneity and instrumental variable construction before

providing additional details about demand and supply side estimation. Finally, I present the estimated parameters.

4.1 Endogeneity and Instruments

The primary endogeneity concern is that the firm can choose price, slant or topic coverage according to realizations of the demand shocks, $\Delta\xi_{ejzt}$, which are observed by firms but not by the econometrician. For instance, if a newsworthy event causes a sharp increase in the demand for local news in a particular town, local newspapers may attempt to tailor their content towards this town's tastes. To address this concern, I adapt the instrumental variables design of Fan (2013), which takes advantage of the partially-overlapping markets of local newspapers.

I use the market characteristics of competitors' markets (excluding the focal firm's own markets) as instruments for the focal firm's endogenous product characteristics. These market characteristics shift demand for the competitors' newspaper, which changes the competitors' product positioning, and thus impacts the focal firm's strategy. However, these market characteristics are outside of the area where the focal firm sells newspapers and should not be correlated with the the focal firm's market-specific taste shocks.

I use census characteristics (median income, racial demographics, educational attainment) to construct instruments. In addition, I use Democratic and Republican ideal points and religiosity data from the U.S. Religion Census to construct instruments that may shift demand for competitors' ideological content. I also use a more direct source of exogenous variation in news reporting, the absolute and scaled (relative to national average) COVID-19 incidence and test positivity. During the sample period of 2020-2021, stories about COVID-19 account for a substantial portion of coverage, so a spike in COVID-19 locally may crowd out other stories and lead to a greater deviation from the national papers' issue agendas. Finally, I use interactions between the ideal points with the other characteristics as additional

instruments.[14]

The census, religiosity and ideal point data are mostly cross-sectional: the census and religiosity data do not vary in my sample, and the ideal point data vary only if the Congressional representatives for an area change between 2020 and 2021. The COVID-19 data are aggregated bi-annually in order to more consistently compare across areas since not all counties report figures on the same day or in the same month.

Compared to Fan (2013), I change how instruments are weighted in order to increase the relevance of the instruments. Instead of taking means of characteristics of competitors' markets, I weight these characteristics by the lagged one-year rolling average of competitor circulation. This change is intended to strengthen the relevance of the instruments since firms likely tailor their reporting more to areas where they sell more papers.

To assess the strength of the instruments, I estimate an analogous homogeneous aggregate logit model via 2SLS and calculate the first-stage partial F statistics. All partial F-statistics exceed 275. See Appendix Table 4 for the first-stage estimates.

4.2 Demand Estimation

I estimate the demand-side model analogously to BLP (Berry et al., 1995). Compared to the standard BLP setup, my model also incorporates a mixture of Republican and Democrat consumers in each market, where the proportion of each type is governed by the observed 2020 presidential vote share. Using conventional notation for BLP-like models, I present the

[14] I do not include interactions between ideal points and either the scaled COVID-19 characteristics or vote shares, as these are very correlated with the corresponding non-interacted instruments.

empirical analogue to (3.1). Let the utility less the taste shock ε_{iejt} be defined as:

$$V_{iejt} = \delta_{ejt} + X_2[\Pi d_i + \Sigma\nu_i], \tag{8}$$

$$\text{where } \delta_{ejt} = \beta^{ex}\mathbf{X}_{ejzt} + \alpha p_{ejt} + \Delta\xi_{ejzt} \tag{9}$$

$$X_2 = \begin{bmatrix} (slant_{jt} - ideal^D_{zt})^2, & (slant_{jt} - ideal^R_{zt})^2 \\ TopicSim_{jt}, & TopicSim_{jt} \end{bmatrix} \tag{10}$$

$$d_i = [1 * (i \in Democrats), 1 * (i \in Republicans)]' \tag{11}$$

and Π, Σ, β^{ex} and α are parameters to be estimated.[15] δ_{ejt} is the market-quarter mean utility for the e edition of paper j, which includes prices, as well as the fixed effects and exogenous variables described in Section 3.1. X_2 is a matrix consisting of the slant and the de-meaned topic coverage variables, and d_i is a matrix of indicator variables describing the political affiliation of i. Lastly, ν_i is a matrix where entries corresponding to parameters associated with i's political party are standard normal draws, and otherwise zero. Since party affiliation is mutually-exclusive, d_i only has one non-zero entry for each simulation draw. Thus, utility associated with Democrat preference parameters is zero for Republican consumers and vice-versa.

The data market shares are calculated as the total circulation in a market divided by the number of households in the market. The estimated market shares, taking product characteristics as given, are calculated by simulating an integral over the distribution of consumer party affiliations:

$$s_{ejzt}(\delta, \Pi, \Sigma) \approx \frac{1}{R}\sum_r \frac{\exp(V_{rejt})}{1 + \sum_{k \in J_{ezt}} \exp(V_{rekt})} \tag{12}$$

$$\text{where } Pr(r \in Democrats) = Vote^D_z. \tag{13}$$

[15] I also estimate an alternate specification where I allow Democrats to have a separate intercept to allow for different valuations of the outside good. However, the estimated party-specific intercept was imprecise and not statistically significant. As a result, I do not include party-specific valuations of the outside good in the main specification.

Moreover, J_{ezt} denotes the set of all $e \in \{weekend, weekday\}$ edition papers that are sold in market z in time period t, and the probability that simulated agent r is a Democrat is equal to the Democratic 2020 presidential election vote share in zip code z, $Vote_z^D$. Due to lack of zip code-level data on third party presidential candidate vote shares, I treat all non-Biden voters as Republicans for the purposes of the model.

The estimates are obtained in the standard IV-GMM manner for BLP-type models, where estimates of δ_{ejzt} are obtained via contraction mapping, $\hat{\beta}^{ex}$ and $\hat{\alpha}$ are obtained via 2SLS, the GMM moments are:

$$\Delta\xi_{ejzt} Z = 0, \tag{14}$$

$$\text{where } \Delta\xi_{ejzt} = \delta_{ejzt} - X_{ejzt}^{ex}\hat{\beta}^{ex} - \hat{\alpha}p_{ejt}, \tag{15}$$

and Z is the matrix of instruments as described in Section 4.1. I estimate the parameters using PyBLP (Conlon and Gortmaker, 2020), and compute simulated integrals using $R = 2000$ Halton draws.

4.3 Supply Estimation

Using the estimated demand parameters, I back out the slope of the fixed cost functions implied by the firm's first order conditions implied by (3.2). For ease of notation, define

$$Revenue_{jt} = \frac{1}{\sum w_e} \sum_e w_e * p_{jt} * HH_{ejt} * s_{ejt}(\mathbf{slant_t}, \mathbf{topicSim_t}), \tag{16}$$

Then the firm's first order conditions are, for each of $d_{jt} \in \{slant_{jt}, topicSim_{jt}\}$:

$$\frac{\partial}{\partial d_{jt}} Revenue_{jt} = \gamma_0^d + \gamma_1^d d_{jt} * log(articles_{jt}) + \gamma_2^d d_{jt}^2 * log(articles_{jt}) + \eta_{jt} \tag{17}$$

I calculate the left-hand side, the derivative of $Revenue_{jt}$, numerically using the demand

Table 2: Estimated Demand parameters

Parameter	Estimate	Std Dev.
Democrats		
(Slant-Ideal)^2	-3.025***	2.137***
	(0.732)	(0.633)
Topic Sim. to Natl	0.829*	
	(0.390)	
Republicans		
(Slant-Ideal)^2	-1.063**	
	(0.408)	
Topic Sim. to Natl	-0.570***	
	(0.179)	
Mean Utility		
Cover Price	-0.068*	
	(0.029)	
1*(Home County)	1.098***	
	(0.049)	
Mi. To Home County (100s)	-0.532***	
	(0.092)	

Heteroskedasticity-robust standard-errors in parentheses
Signif. Codes: ***: 0.001, **: 0.01, *: 0.05
Table presents the estimated utility parameters for the model. For simplicity, I present estimates for a more restrictive model that allows heterogeneity only in Democratic preferences for slant. I also estimate a less restrictive model specification where I allow random coefficients on the slant and topic coverage parameters for both segments. I estimate the heterogeneity to be very close to zero for all but the Democratic slant preference.

estimates. I then estimate the γ parameters via OLS.

Firms observe each others' strategies and simultaneously choose their levels of political slant and topic coverage in a non-cooperative product positioning game. The Nash equilibrium conditions are that Equation 4.3 holds for all firms in the market.

4.4 Estimation Results

4.4.1 Demand

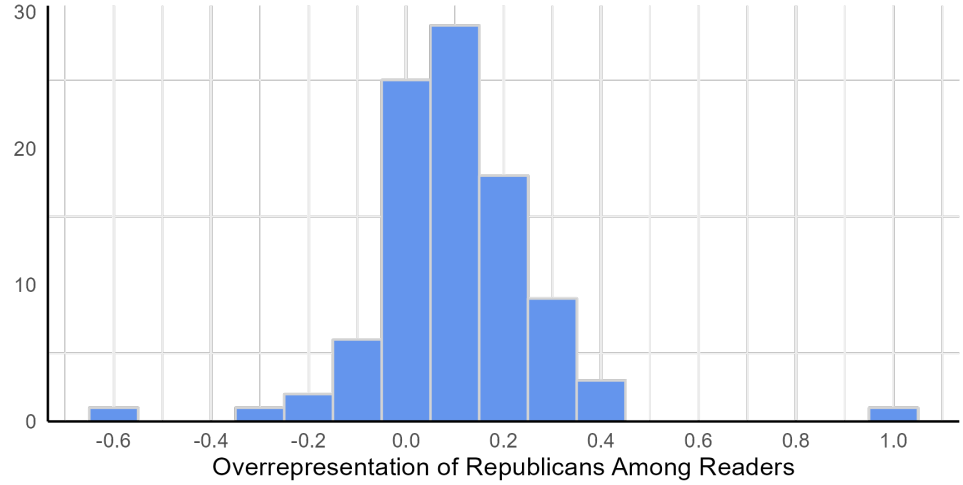
Table 2 displays the estimated demand parameters. In estimating the model I find near-zero heterogeneity in Democratic preferences for topic coverage as well as Republican preferences for both slant and topic coverage. Thus for simplicity I present the estimates for a more restricted model where I only allow random coefficients for the Democratic slant preference. The displayed coefficients are nearly-identical compared to those estimated under the less restricted model. The first column presents estimates of the mean preferences for each component of utility while the second column presents estimates of the standard deviations of normally-distributed heterogeneous preference shock, where applicable.

On average, Democrats have a greater distaste for newspaper slant that differs from their political ideal points than do Republicans. On average, Democrats encounter newspapers whose chosen slant is 0.40 away from ideal, compared to 0.42 for Republicans. Relative to these mean values, a change of one standard deviation in slant (0.112) closer to the ideal point has an average impact on utility equivalent to a price decrease of $3.42 for Democrats and $1.27 for Republicans. These are substantial effects relative to the average per-copy price of $2.70. Democrats also exhibit considerable heterogeneity in this slant preference.

Democrats and Republicans differ in their preferences for topic coverage by newspapers. Democrats prefer newspapers that are more similar in terms of which issues are covered to the mainstream national newspapers, which are defined as the New York Times, the Washington Post and USA Today. For Democrats, a one standard deviation decrease (0.118) in similarity between a local paper and the national papers results in disutility equivalent to a $1.44 price increase for Democrats. Republicans prefer specialized coverage that deviates from the news agenda of national papers. For Republicans, a one standard deviation decrease in topic similarity to national papers has a utility effect equivalent to a $0.99 price *decrease*.

One possible concern with the estimates of topic coverage preferences could be related

Figure 6: Distribution of Polarized Consumption



Histogram illustrates the distribution of polarized consumption. Each observation is aggregated to the newspaper-level average. The X-axis is the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.

to the general perception that national newspapers are left-leaning. I show in Appendix Section C that the fact that Republicans prefer specialized topic coverage is not driven by the choice of national newspapers as the baseline comparison for topic coverage. In this alternate specification I compare topic to a party-dependent baseline of local newspapers. For Republicans, I compare the focal paper's topic coverage to the 50% of local papers with more Republican slant. Democratic topic preferences are measured analogously. I find that Republicans prefer topic coverage that deviates from the average *Republican-leaning* paper. Thus the Republican preference for specialized topic selection is not driven by the political affiliations of national mainstream newspapers. Instead, I interpret this preference for specialization as reflecting a preference for issues that impact the local community or the social in-group, rather than broader-scale trends in news topics.

Given the estimated demand parameters, I can predict what share of readers of each newspaper are Republican or Democratic. This allows me to estimate the degree of polarized consumption. I define polarized consumption as the percentage over-representation of Republicans predicted among the newspaper's readers relative to the overall proportion of

Republicans in the paper's market:

$$\rho_{jt} = (circ^R_{jt}/circ_{jt} - totalVote^R_{jt})/totalVote^R_{jt} \tag{18}$$

where $circ^R_{jt}$ is circulation attributed to Republican households, $circ_{jt}$ is the total circulation, and $totalVote^R_{jt}$ is the aggregate vote share Republican for all of the markets in which j' is available at time t. Paper-level circulation is calculated as a weighted average of paper-edition circulation, where weekend editions are weighted at 2/7 and weekday at 5/7.

Figure 6 shows the distribution of the average value of ρ_{jt} over time for each newspaper. Most papers are not very polarized in readership, but 10% of papers have readers that are at least 30% more Republican or Democratic in composition than the population. The average paper leans slightly Republican in readership, with readership being 9% more Republican than the population.

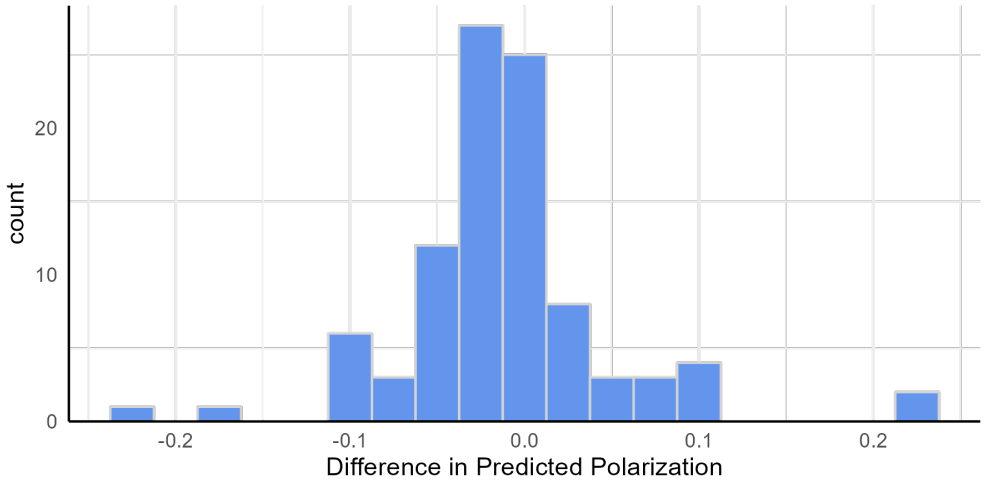
Since Republicans and Democrats differ in tastes over both slant and topics, neglecting to account for newspapers' topic coverage leads to incorrect demand predictions. Figure 7 shows how much these predictions can differ. To generate the figure, I estimate an alternate specification of the demand model without including a term for topic coverage in consumers' utility. I then subtract the slant-only prediction of average polarized consumption from the full-model prediction for each newspaper. Several of these differences are larger than the mean value of 9%.

4.4.2 Supply

Table 3 presents estimates for the slope of the fixed cost function as described in Section 3. As the quadratic functions can be somewhat difficult to interpret, I will provide some intuition for both the slant and topic coverage costs.

The cost of providing slant is highest for moderate Democratic slant. Costs are decreasing in more extreme Democrat slant, and decrease towards moderate Republican slant. Costs

Figure 7: Difference in Predicted Polarized Consumption: Full Model vs. Slant-Only



Histogram describes the differences in polarized consumption predictions between the preferred model and an alternate specification that does not account for preferences over topic coverage. The X-axis denotes the full-model prediction minus the slant-only prediction.

Table 3: Estimates: Slope of Fixed Cost Function

Parameter	Estimate
Slant	
Intercept	201.084***
	(27.470)
log(Articles)	-31.694***
	(4.117)
log(Articles) * Slant	-7.285**
	(2.950)
log(Articles) * Slant^2	44.403***
	(14.184)
Topic Coverage	
Intercept	-80.618***
	(11.014)
log(Articles)	12.252***
	(1.605)
log(Articles) * TopicSim	8.145***
	(2.366)
log(Articles) * TopicSim^2	3.520
	(3.123)

Heteroskedasticity-robust standard-errors in parentheses
Signif. Codes: ***: 0.001, **: 0.01, *: 0.05
Units are in thousands of dollars.

increase again as slant becomes extremely Republican. Larger papers see a steeper slope between moderate Democrat slant and moderate Republican slant, so that larger newspapers save the most on costs for providing moderate Republican slant.

While one may be tempted to speculate as to why moderate Democratic slant is most costly to firms, it is difficult to come to make any conclusions with confidence. These costs could potentially reflect labor costs, in that greater editorial effort may be needed to emulate certain types of political rhetoric. Alternatively, costs could reflect perceived reputational costs. However, without further data on inputs, I cannot draw any certain conclusions.

The fixed costs for topic coverage are highest for very specialized reporting, i.e. issue selection that is extremely different from what is being reported on by national outlets. For small and medium sized newspapers, costs are lowest when providing topic coverage that closely mirrors national news agendas. For the largest firms, costs are U-shaped so that the lowest costs are for moderate amounts of specialization in topic coverage.

Costs on issue reporting are somewhat easier to interpret in light of previous literature. Local news outlets frequently rely on content from wire services and news agencies to relay news to local readers on national stories (Cagé et al., 2020). As utilizing wire services is relatively inexpensive, providing coverage on national stories should be less expensive than producing costly original reporting in order to be more specialized in coverage. However, for large newspapers that write many stories, wire services may not be sufficient in order to provide the same proportion of reporting on national topics. As a result, in order to match the national papers' topic coverage, large local papers would also have to produce more original reporting.

5 Counterfactual Simulations

In this section I consider two counterfactual simulations. First I show how firms and consumers react to a scenario in which firms must report with neutral slant. Politicians on both

sides of the aisle have indicated greater interest in directly limiting political slant in the news industry.[16] Although completely eliminating slant may not be feasible without infringing on the right to free speech, the simulation illustrates the limitations of such efforts even under "ideal" policy aimed towards addressing slant. This exercise also serves a similar purpose as a theoretical comparative static, showing how firms use both dimensions of news reporting to position their products. I show how firms further differentiate on topic coverage when they cannot slant coverage, and how, as a result, polarization in consumption may persist even under politically neutral reporting.[17]

The second counterfactual simulates the potential result of ongoing policy efforts to subsidize or revitalize the local news industry. The details of specific proposed and enacted bills vary, but include efforts such as tax credits for hiring or retaining reporters, tax credits for businesses that advertise in local media or coupon programs that allow consumers to allocate government funds to local news outlets. Generally, these subsidy efforts are thought to promote both growth in the industry and greater variety in available news sources. I abstract away from some of the particulars of these various efforts and simulate one potential outcome, increased entry into the market. The motivations for these policies are varied but often include the notion that increased access to local news could curb political polarization (Rebuild Local News, 2024). For example, previous studies have found that decreased access to local news increases straight-ticket voting (Moskowitz, 2021). While I cannot predict the impact on other behaviors like voting, I show how these policies may unintentionally lead to increases in both political slant and polarization in consumption.

In both sets of counterfactuals I focus on the New Mexico market in the first quarter of 2021. I choose New Mexico because it contains a moderate number of newspapers and

[16]The Supreme Court has recently heard arguments challenging new bills introduced by Republicans aiming to limit social media companies' ability to moderate political content (e.g. Netchoice LLC v. Paxton). On the other side of the aisle, both Democratic politicians and voters alike have expressed support for reinstating aspects of the Fairness Doctrine, which would require broadcast news sources to provide balanced, objective coverage of controversial issues (Klein, 2020).

[17]The appendix contains two additional counterfactual simulations: one where firms all use the average level of topic similarity to national papers and one where consumer ideal points are more homogeneous and near-neutral.

Figure 8: Newspaper Availability: New Mexico

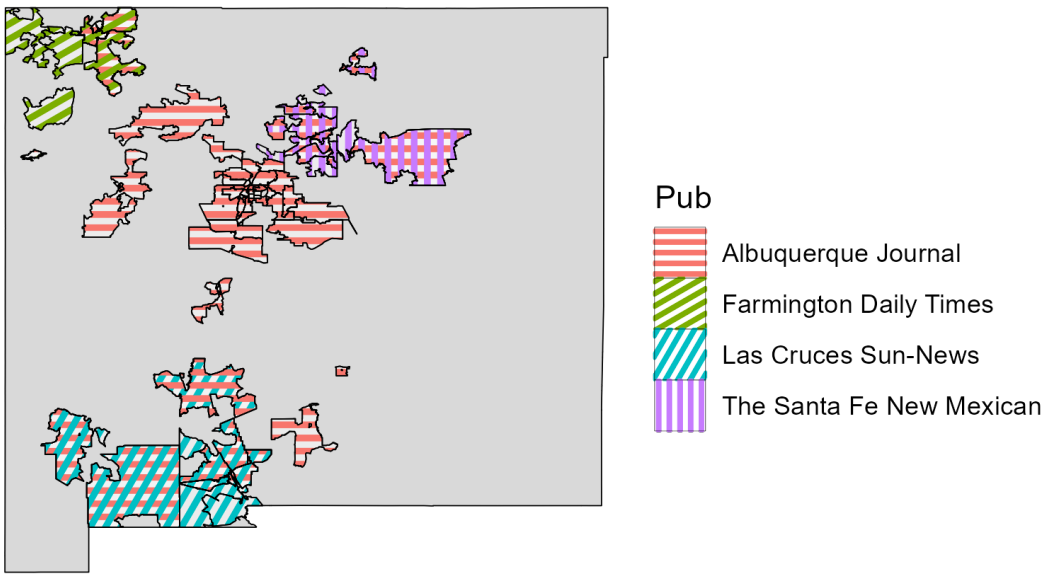


Figure shows the zip code tabulation areas where each newspaper is available. Intersecting lines indicate markets where multiple newspapers are available.

each newspaper's market overlaps with that of a competitor. In Appendix E, I also simulate firm behavior in Florida markets under the same counterfactual scenarios. There are minor differences in outcomes but the overall conclusions are consistent with the results I present in this section.

Figure 8 shows the newspapers in the New Mexico sample and their respective markets. The Albuquerque Journal is the largest paper, and it competes with each of the other three local newspapers. For simplicity, I include only local newspapers based in New Mexico as players in the game.[18]

[18]For instance, I do not model the choices of papers like the El Paso Times, which is available in southern New Mexico but would also be responding to the product positioning of firms in Texas.

5.1 Limiting Partisan Slant

First, I consider a scenario in which all firms in the market are restricted to neutral slant. The goal of this exercise is two-fold. By fixing slant at zero, I show how firms may still target specific consumer segments by further differentiating over topic coverage. As a result, Republicans and Democrats self-select into different news sources, even absent political slant. This illustrates one of the major conceptual contributions of the paper. Rather than thinking of partisan slant as the sole or primary driver of ideological segregation in news consumption, Republicans and Democrats may also prefer different news sources because they differ on which issues they find important.

Additionally, we can think of this simulation as an exaggerated outcome of policies aimed towards regulating partisan content in the news. Though free speech doctrine limits the government's ability to impose restrictions on news content, there has been increased interest from Republican lawmakers in limiting the editorial choices of firms in promoting particular political viewpoints (Netchoice, LLC v. Paxton, 2022). Normatively, political slant in news media may be concerning because it blurs the line between opinion and factual reporting. Moreover, partisan slant has been linked to persuasive effects that may influence consumers' political beliefs (Martin and Yurukoglu, 2017). Given these concerns, a regulator may feel that policies aimed at reducing political slant in news media are justified. The results I present here may then serve to illustrate possible outcomes of policies in this vein.

To implement these simulations, I solve for firms' moves that satisfy the equilibrium conditions given by the firm's first order conditions in Equation (4.3). For this simulation, since firms cannot adjust slant, I only use the first order conditions pertaining to choice of topic coverage. In the second counterfactual in the following subsection, where slant is unrestricted, I use the full set of first-order conditions in evaluating potential equilibria.

I solve for the equilibrium by optimizing over the firms' slant and topic coverage choices, with the objective function being the squared loss relative to the first order conditions. I use the squared loss rather than enforcing that the first-order conditions hold exactly because the

Figure 9: Counterfactual Product Positioning: Neutral Slant

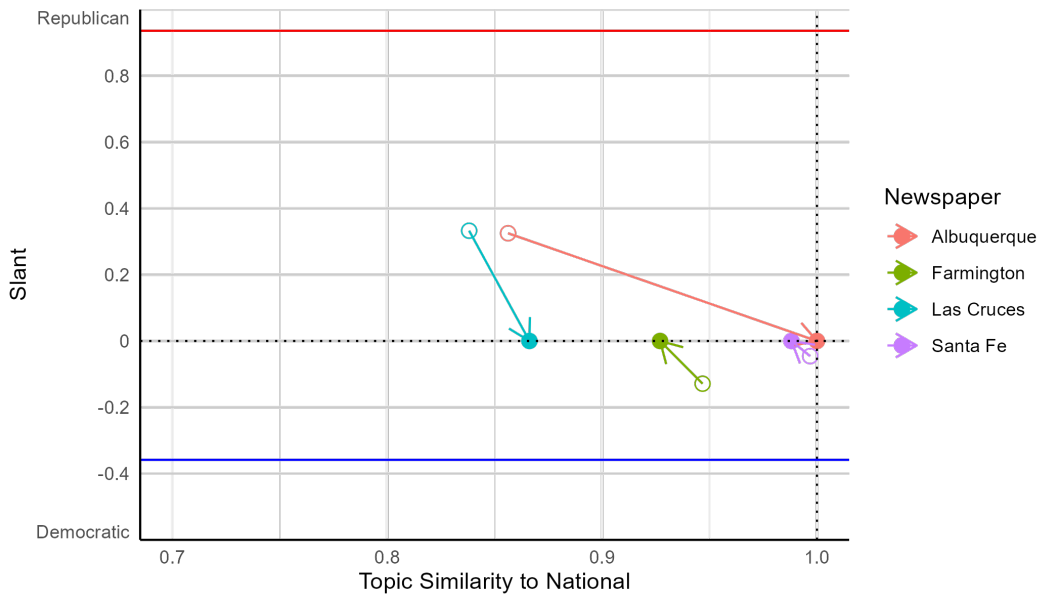


Figure shows change in firms' product positioning between the status quo choices (open circle) and the choices under the counterfactual (full circles). The Y-axis indicates the chosen slant, where positive is more Republican. The x-axis shows the chosen topic coverage, where more positive indicates that topic coverage is more similar to the average national newspaper.

firms can choose product characteristics that are on the boundary of the parameter space. Recall that slant is defined over $[-1, 1]$ while topic similarity to national papers is defined over $[0, 1]$. In the data, firms sometimes choose topic coverage that is very close 1, nearly matching the national topic agenda. Solving for firms' equilibrium strategies via numerical optimization is tractable since the newspapers must choose the same product characteristics for all markets at once, compared to a typical BLP setting where different prices may be chosen for each market. For some of these counterfactual simulations, I find that the model may arrive at multiple equilibria. However, across the equilibria that I have found, the general conclusions I draw from these simulation results are qualitatively similar to the set of results I present in this section.[19]

Figure 9 illustrates the changes to firms' product positioning under the counterfactual.

[19]I am currently further investigating the multiple equilbria arrived at in these simulations. First, I plan to more systematically describe which equilibria occur, and which are more common or stable. I will then explore potential selection rules or equilibrium refinements. This work is ongoing.

Figure 10: Counterfactual Polarized Consumption: Neutral Slant

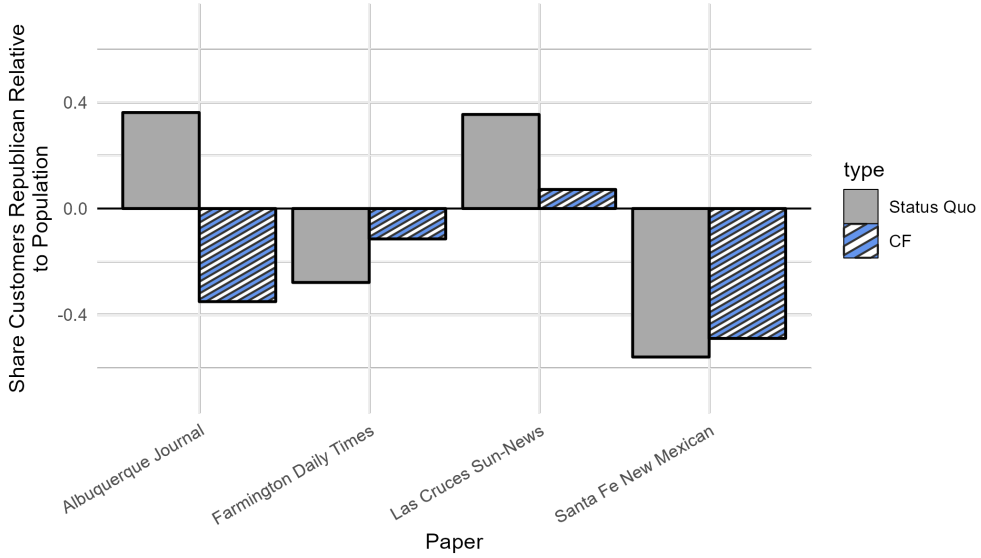


Figure shows the degree of polarized consumption for each firm under the status quo and the counterfactual scenario. The Y-axis measures the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.

Empty circles indicate newspapers' status quo product characteristics, while full circles indicate choices under the counterfactual. The red and blue lines represent the average ideology of Republican and Democrat congressional members for the state, respectively.

The Albuquerque Journal dramatically changes its topic coverage strategy to target Democrats in response to being unable to slant coverage. The remaining newspapers, make more moderate adjustments to topic coverage. The Farmington and Santa Fe papers, which had Democratic-leaning readerships under the status quo, adjust their topic coverage to slightly attract more Republicans in response to the Albuquerque Journal's new Democrat-focused strategy. Overall, since firms cannot slant coverage, firms must adjust their topic coverage strategies since that becomes their sole dimension of horizontal differentiation.

Figure 10 illustrates the extent of polarized consumption when firms report with neutral slant but differentiate more over topic coverage. Under the status quo, two papers have readers that are 35-36% more Republican than the population, and two papers have readerships that are 28-56% more Democratic than the population. When all firms are restricted

to neutral slant, polarized news consumption decreases sharply for the Farmington Daily Times and the Las Cruces Sun-News. However, the readerships of the Albuquerque Journal and the Santa Fe New Mexican remain relatively polarized, though the Albuquerque Journal now skews strongly Democratic rather than Republican in readership.

To get a sense of the extent of polarized news consumption at the state-level, I take a circulation-weighted average of the absolute value of each firm's polarized consumption, which I will refer to as the "average polarization index", $\tilde{\rho}_t$. This index is defined below, where $circ_{jt}$ is the average circulation of firm j during period t and ρ_{jt} is the polarized consumption as defined in Equation (18).

$$\tilde{\rho}_t = \frac{\sum_j circ_{jt} * |\rho_{jt}|}{\sum_j circ_{jt}} \tag{19}$$

Higher values of $\tilde{\rho}_t$ indicate more polarized readerships, and a value of zero implies that each newspaper is equally preferred by both Democrats and Republicans.

The average polarization index decreases only from 37.8% to 30.2% when firms are forced to report with neutral slant. This reflects the fact that, even under neutral slant, firms like the Albuquerque Journal can still to tailor topic coverage towards specific consumer segments. Moreover, even if reporting is not politically slanted, the fact that readership remains nearly as polarized as under the status quo may still be normatively concerning. Polarization in news consumption may create more social distance between Republicans and Democrats since these preferences may contribute to their senses of social and political identity (Berger and Heath, 2007; Schoenmueller et al., 2023). This social distance could then lead to greater animosity between members of the two parties, worsening political divides (Iyengar et al., 2012). Thus, even if policymakers could directly limit political slant, the impact of such policies on concerns related to polarized news consumption could be quite limited due to firms' ability to differentiate over topic coverage.

More broadly, this simulation also serves to illustrate the fact that there is not a pre-

dictable relationship between political slant and polarized news consumption when firms are free to differentiate over topic coverage. The impact of any change in political slant on both overall demand and the political composition of readers depends on the topic coverage strategy chosen in equilibrium. If the Albuquerque Journal had not been able to further shift its topic coverage toward Democratic tastes, readership would have been much less polarized compared to what is shown in Figure 10. However, the other three firms would all have more polarized readerships if they had not adjusted their topic coverage. The impact of any change in slant on both overall demand and polarization in news consumption depends on the equilibrium topic selection strategies of firms.

Appendix Section D.1 further illustrates this fact through an additional counterfactual simulation showing how profit maximizing slant can change substantially when firms are restricted to report with the average level of topic specialization. The fact that the optimal slant depends on the choice of topic coverage can be especially important for analyses that interpret deviations from profit-maximizing slant as evidence of political motives of firms (Gentzkow and Shapiro, 2010; Martin and Yurukoglu, 2017). Deviations attributed to political motives may actually reflect profit-maximizing behavior given the firm's unobserved topic coverage strategy.

5.2 Government Subsidies and Entry

In this subsection, I consider how public policy that seeks to subsidize the local news industry and stimulate competition may impact firms' reporting and the polarization of news consumption. Supporters of such policies often argue that these policies may help abate political polarization. In contrast, I show how increased competition may cause more extreme slant in reporting, more differentiation in topic coverage and more polarization in news consumption.

In doing so, I build upon previous work that also simulates changes to competition in the market for newspapers (Fan, 2013; Gentzkow et al., 2014). Compared to these prior papers,

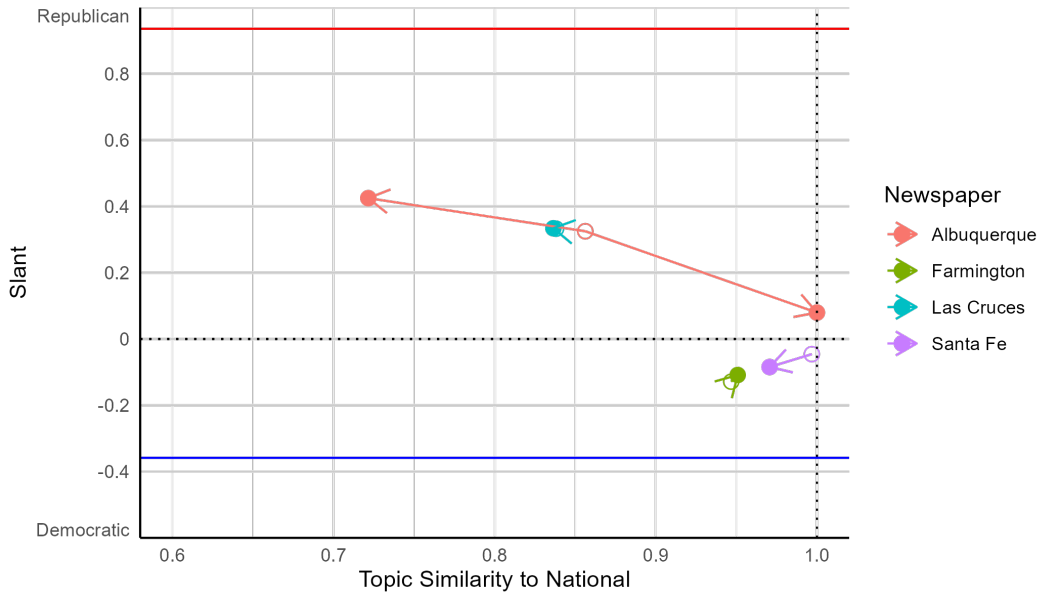


Figure 11: Counterfactual Product Positioning: Entry

Figure shows change in firms' product positioning between the status quo choices (open circle) and the choices under the counterfactual (full circles). The Y-axis indicates the chosen slant, where positive is more Republican. The x-axis shows the chosen topic coverage, where more positive indicates that topic coverage is more similar to the average national newspaper.

I abstract away from some aspects of the supply-side like competition for advertising in favor of modeling a more complicated demand-side where firms compete for different consumer segments with heterogeneous preference parameters. This focus allows me to connect product positioning choices to polarization in news consumption.

I simulate a competitor to the largest newspaper in the state, the Albuquerque Journal. To abstract away from other unobserved differences that are absorbed into the fixed effects, I assume that the new entrant is identical to the Albuquerque Journal, operating in the same markets and providing the same exogenous product characteristics. The simulated firm only differs from the Albuquerque Journal in being able to make its own moves in the game.

Figure 11 shows how this increased competition impacts firms' product decisions. Notably, the simulated entrant and the Albuqeurque Journal choose very different product positions. Compared to the Albuquerque Journal's status quo positioning, the two firms choose to more closely target individual segments of the market. One firm chooses more

Figure 12: Counterfactual Polarized Consumption: Entry

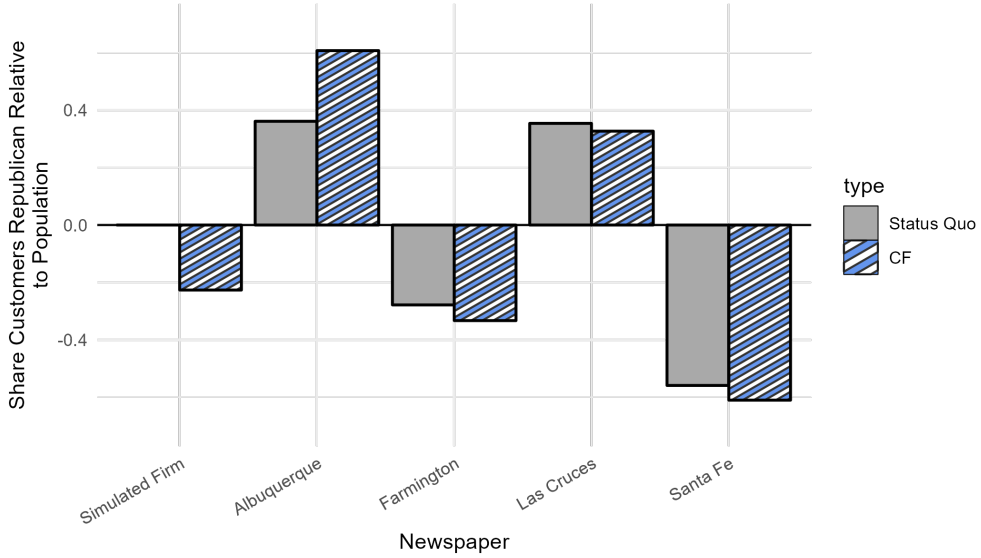


Figure shows the degree of polarized consumption for each firm under the status quo and the counterfactual scenario. The Y-axis measures the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.

extreme Republican slant and even greater specialization in topic coverage, while the other brings slant closer to neutral and chooses topic coverage that closely mirrors national newspapers. The response of the competing firms is somewhat muted. This reflects the fact that consumers have a relatively strong preference for newspapers that are based nearby. As a result, there is both limited substitution to the Albuquerque papers and limited competitive response, even when the entrant locates close to the Santa Fe and Farmington papers in product space.

Figure 12 shows how the two Albuquerque firms' new segmentation strategies lead to greater overall polarization in consumption: the average polarization index, $\tilde{\rho}_t$, increases from 37.8% to 41.0%. The new entrant skews towards Democratic readers, while polarized consumption increases sharply for the Albuquerque Journal. Over-representation of Republicans among the readership of the Albuquerque Journal increases from 36% to 65%. The increased competition has little to no benefit for polarized readerships outside of Albuquerque either. The other local newspapers remain at relatively similar levels of polarized

consumption, with two of the three exhibiting slight increases in polarized consumption.

Other work has linked increased competition in the news industry to increased partisanship when consumers demand ideological content (Mullainathan and Shleifer, 2005; Gal-Or et al., 2012; Gentzkow et al., 2014). I find a similar result, with some additional nuances. First, the costs associated with ideological content moderate the degree of differentiation. The simulated entrant would earn more market share from choosing a more Democratic slant strategy, but does not do so due to the associated costs. Second, the fact that firms also differentiate over topic coverage affects the composition of consumers who choose each newspaper. The new entrant chooses slightly right-of-center slant, but its topic coverage is more aligned with Democratic preferences. As a result its readership skews more Democratic than might be predicted under a model that doesn't take into account partisan tastes for issue coverage.

Ultimately I find that government subsidies may lead to more slanted news coverage and more polarization in news consumption. If policymakers are also worried about polarization in news consumption or partisan slant in news coverage, then efforts to subsidize the local news industry may have unintended drawbacks. However, while I highlight one potentially undesirable consequence, such policies may carry other benefits. For instance, more local news outlets may increase civic engagement (Shaker, 2014). With the declining number of local newspapers, policymakers will have to weigh potential increases in political slant or polarized consumption against these possible benefits of subsidizing the news industry.

6 Conclusion

In this paper I investigate how partisan preferences for ideological content and issue coverage differ in the demand for local newspapers. I create a novel text-based metric for political slant that separates differences in partisan rhetoric from selection over issues. I use this metric to estimate a structural model of partisan demand for local newspapers and investigate how

preferences for news content differ among Republicans and Democrats.

In contrast to Hotelling-type models of political bias in the news industry, I find that polarization in news consumption is not caused solely by partisan slant. Instead, Republicans and Democrats differ not only in which viewpoints they prefer in news coverage but also in which issues they prefer to learn about. Democrats prefer topic coverage that mirrors that of mainstream national newspapers while Republicans preferred more specialized coverage of issues.

Given these preferences, I simulate how firms change their product positioning under different counterfactual scenarios. First, I show that Republicans and Democrats may still select into different news sources even if firms cannot slant coverage, since firms can instead further differentiate on topic coverage. This exercise illustrates the importance of accounting for topic coverage when examining how news content affects demand. I then simulate the impacts of potential public policy that seeks to subsidize the news industry, potentially promoting entry. I find that increased competition may lead firms to target individual consumer segments, leading to more extreme slant and greater polarization in media consumption. This is counter to one of the stated goals of the proponents of such policies, that subsidizing local news organizations can decrease political polarization. This increased slant and ideological segregation in news consumption must be weighed against other potential benefits of such policies, like increased civic engagement at the local level.

While my work in this paper emphasizes the role of partisan consumer preferences in determining news outlets' product decisions, a promising avenue for future research may lie in taking a more detailed look at the behavior of news organizations. Access to more detailed data on firm inputs might allow for better understanding of what other forces underlie the firm's problem in determining news reporting strategies. A deeper understanding of the supply-side might allow for finer-grained examinations of specific policy proposals and their impacts on news content, like the impact of subsidizing reporters' salaries compared to that of unrestricted grants. On the demand side, future work could also provide more

detailed insights on consumers' preferences for news topics. While I have focused on a general treatment of topic coverage in order to tractably model firm behavior, future research could take a more granular approach in examining how different consumers value news on different issues, and how these preferences change over time.

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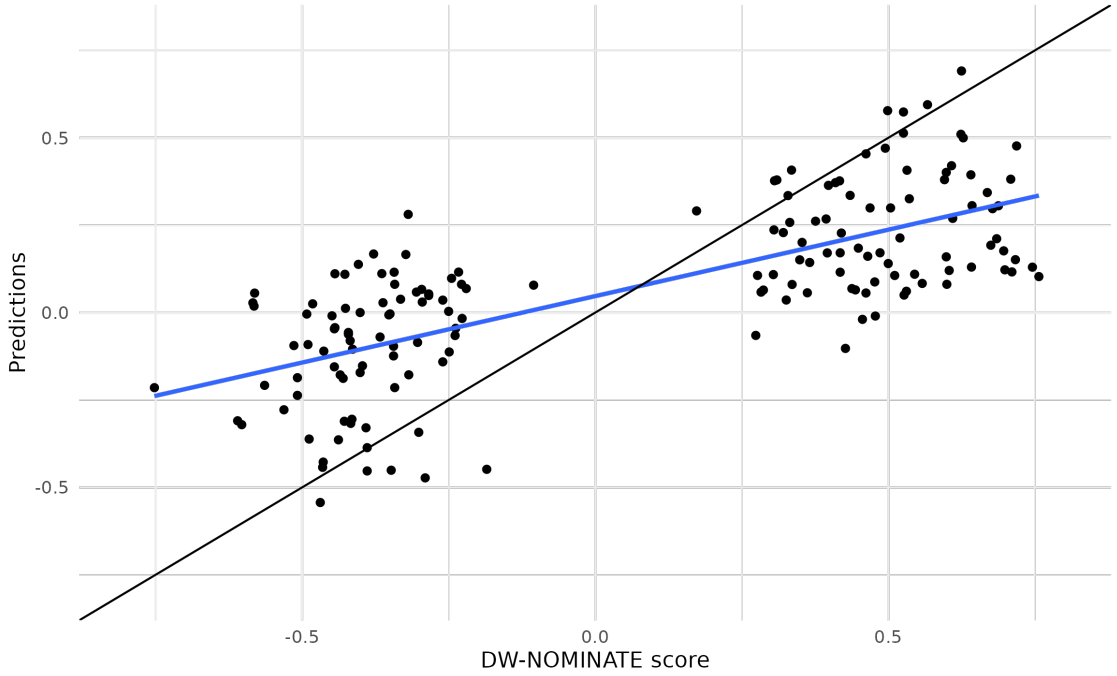
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Appendices

A Evidence of Slant Prediction Fit

Figure 13 plots predicted ideology against the observed ideology of Congresspeople in a 20% holdout sample. While there is a clear correlation between the predictions and the observed ideology scores, the fit is not perfect. This reflects the difficulty of using solely language to predict a continuous measure of ideology. If we were to use the regression to classify positive predictions as Republican and negative predictions as Democratic, then the classification accuracy would be 80%.

Figure 13: Model Fit: Slant Metric



B Instrument Strength: First Stage estimates

To assess the relevance of the instruments, I estimate a homogeneous aggregate logit analogue to the demand model using two-stage least squares. The first stage estimates from this regression are presented in Table 4. Notably the first-stage partial F statistic for each endogenous variable in the model are all at least 275.

Dependent Variables:	(slant-D Ideal)^2	(slant-R Ideal)^2	Topic Sim to Natl	Prices
Model:	(1)	(2)	(3)	(4)
Variables				
mean_iv_voteR	-0.3545***	0.5413***	-0.0803***	0.5733***
	(0.0239)	(0.0277)	(0.0208)	(0.0831)
mean_iv_dem_ideal	0.4417	-0.6954	10.20***	-34.05***
	(0.3709)	(0.4366)	(0.4414)	(1.443)
mean_iv_rep_ideal	0.3182*	0.4806***	-2.642***	6.044***
	(0.1762)	(0.1612)	(0.1642)	(0.4891)
mean_iv_religiosity	0.0167***	-0.0025	-0.0103***	0.0830***
	(0.0020)	(0.0021)	(0.0019)	(0.0059)
mean_iv_change_cases	0.0001***	-0.0005***	0.0004***	-0.0011***
	(1.8×10^{-5})	(2.37×10^{-5})	(1.34×10^{-5})	(7.39×10^{-5})
mean_iv_change_cases_scaled	-0.0987***	0.2340***	0.0171	-0.1160*
	(0.0155)	(0.0181)	(0.0107)	(0.0593)
mean_iv_test_pos	0.0076***	-0.0087***	0.0105***	-0.0032
	(0.0006)	(0.0007)	(0.0005)	(0.0024)
mean_iv_test_pos_scaled	-0.2510***	0.1967***	-0.2063***	0.7870***
	(0.0156)	(0.0178)	(0.0121)	(0.0601)
mean_iv_bachelors	0.1260***	-0.2011***	-0.5060***	1.293***
	(0.0191)	(0.0219)	(0.0223)	(0.0535)
mean_iv_income	-0.0153***	0.0188***	-0.0222***	0.0835***
	(0.0006)	(0.0006)	(0.0007)	(0.0033)
dem_iv_bachelors	0.1272*	-0.1904**	-1.835***	2.998***
	(0.0674)	(0.0775)	(0.0789)	(0.1905)
dem_iv_income	-0.0361***	0.0290***	-0.0215***	0.1579***
	(0.0015)	(0.0015)	(0.0015)	(0.0089)
dem_iv_religiosity	0.0506***	-0.0281***	-0.0162***	0.2706***
	(0.0042)	(0.0053)	(0.0052)	(0.0147)
dem_iv_change_cases_scaled	-0.3252***	0.5697***	-0.2168***	-0.1981
	(0.0427)	(0.0446)	(0.0262)	(0.1805)
dem_iv_test_pos_scaled	-0.2975***	0.2270***	0.3188***	0.2689**
	(0.0290)	(0.0314)	(0.0225)	(0.1340)
rep_iv_bachelors	-0.2698***	0.4474***	-0.2377***	-0.5984***
	(0.0256)	(0.0274)	(0.0318)	(0.0768)
rep_iv_income	-0.0026***	-0.0095***	0.0184***	-0.0442***
	(0.0008)	(0.0009)	(0.0008)	(0.0021)
rep_iv_religiosity	0.0065***	-0.0141***	0.0245***	-0.0009
	(0.0023)	(0.0020)	(0.0018)	(0.0057)
rep_iv_change_cases_scaled	-0.0156	0.0353**	-0.2299***	-0.0603
	(0.0131)	(0.0163)	(0.0102)	(0.0401)
rep_iv_test_pos_scaled	0.0928***	-0.0332*	0.3930***	-1.169***
	(0.0154)	(0.0174)	(0.0103)	(0.0567)
home_county	0.0045**	-0.0011	0.0015	-0.0125
	(0.0020)	(0.0021)	(0.0010)	(0.0088)
mi_to_home_county	6.04×10^{-5}**	8.78×10^{-6}	1.4×10^{-5}	-0.0004***
	(2.69×10^{-5})	(3.5×10^{-5})	(1.44×10^{-5})	(0.0002)
Fixed-effects				
zip	Yes	Yes	Yes	Yes
Pub-Edition	Yes	Yes	Yes	Yes
Quarter	Yes	Yes	Yes	Yes
Fit statistics				
Observations	112,678	112,678	112,678	112,678
R^2	0.67222	0.75653	0.86833	0.88150
Within R^2	0.04988	0.04970	0.18852	0.08289
F-test (1st stage)	275.96	275.13	1,222.3	474.80

Heteroskedasticity-robust standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 4: Homogeneous Aggregate Logit: First Stage

C Alternate Demand Specification: Topic Similarity to Similar-Ideology Papers

One concern with how I measure topic coverage could be that the effects I find are driven by the political leanings of the national newspapers. There is a general perception that the major national newspapers are left-leaning, though I measure them to be fairly centrist in terms of slant. If these newspapers chose topics to report on in order to favor the Democratic party (i.e. topic coverage were used to signal ideology), then the concern would be that Republicans do not actually have tastes for specialized reporting but instead are reacting to pro-Democratic topic coverage.

Table 5: Demand Estimates: Topic Similarity to Similar-Ideology Papers

Parameter	Estimate	Std Dev.
Democrats		
D (Slant-Ideal)^2	-1.692*	1.319
	(0.816)	(0.912)
D Topic Sim. to Left	0.488***	0.010
	(0.134)	(9.233)
Republicans		
R (Slant-Ideal)^2	-2.238$^{\cdot}$	0.000
	(1.248)	(76.773)
R Topic Sim. to Right	-0.936$^{\cdot}$	0.000
	(0.520)	(54.890)
Mean Utility		
Cover Price	-0.051$^{\cdot}$	
	(0.028)	
1*(Home County)	1.098***	
	(0.050)	
Mi. To Home County	-0.537***	
	(0.093)	

Table displays demand estimates for an alternate model specification where topic preferences are measured relative to a baseline of the 50% of local newspapers that have slant that is more favorable for the consumer's political party. Significance codes: ***: 0.001, **: 0.01, *: 0.05, $^{\cdot}$: 0.1

To rule this explanation out, I estimate an alternate specification for robustness. In this specification I compare newspapers' topic coverage to the choices of left and right-leaning local newspapers. I take a median split of the papers by slant and allow Republicans to have preferences over the topic similarity between the focal paper and the average right-leaning paper. I measure Democratic topic preferences analogously.

I find qualitatively similar results which are presented in Table 5. Republicans demand topic preferences that diverge from the average topic agenda of Republican-leaning papers. This implies that the preference for specialized topic coverage is not driven purely by the fact that national papers are often perceived as left-leaning. In fact, on average, Republican-

leaning papers are quite similar to the national newspapers in topic coverage. I interpret the overall finding to reflect that Republicans may have a preference for issues that are more impactful to their local community or day-to-day lives while Democrats may have a preference for larger-scale news trends.

D Additional Counterfactual Simulations

D.1 Counterfactual: Fixing Topic Coverage

In this subsection, I fix all newspapers' topic coverage at the average similarity to national newspapers, 0.904. This exercise is intended to further illustrate the fact that the profit-maximizing slant chosen by the firm depends on the equilibrium topic coverage chosen by both the focal firm and its competitors.

Figure 14: Counterfactual Product Positioning: Fixing Topic Coverage

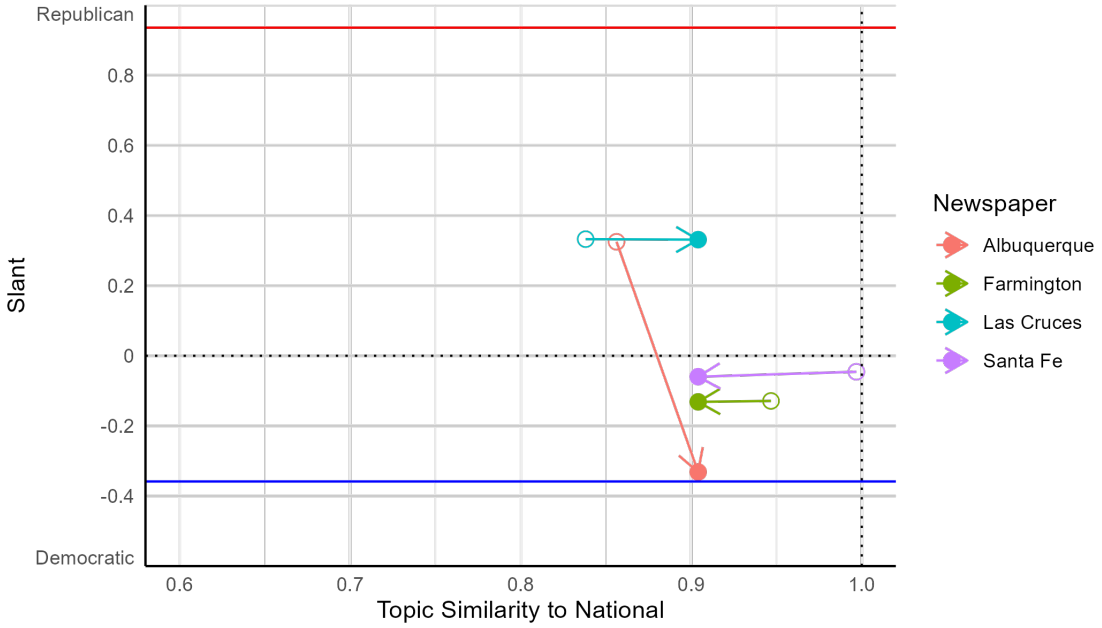


Figure shows change in firms' product positioning between the status quo choices (open circle) and the choices under the counterfactual (full circles). The Y-axis indicates the chosen slant, where positive is more Republican. The x-axis shows the chosen topic coverage, where more positive indicates that topic coverage is more similar to the average national newspaper.

Figure 14 shows how firms adjust their slant strategies under the counterfactual. Similarly to the counterfactual where slant is fixed at 0, here the Albuquerque Journal shifts its slant strategy to strongly attract Democrats, with slant now at nearly the same ideology as the average Democratic congressperson.

Figure 15 shows the resulting effect on polarized consumption. As a result, the Albuquerque Journal's readership is now much more polarized than before, but now strongly skewing towards Democrats. At the same time, the other firms' readerships do not change

Figure 15: Counterfactual Polarized Consumption: Fixing Topic Coverage

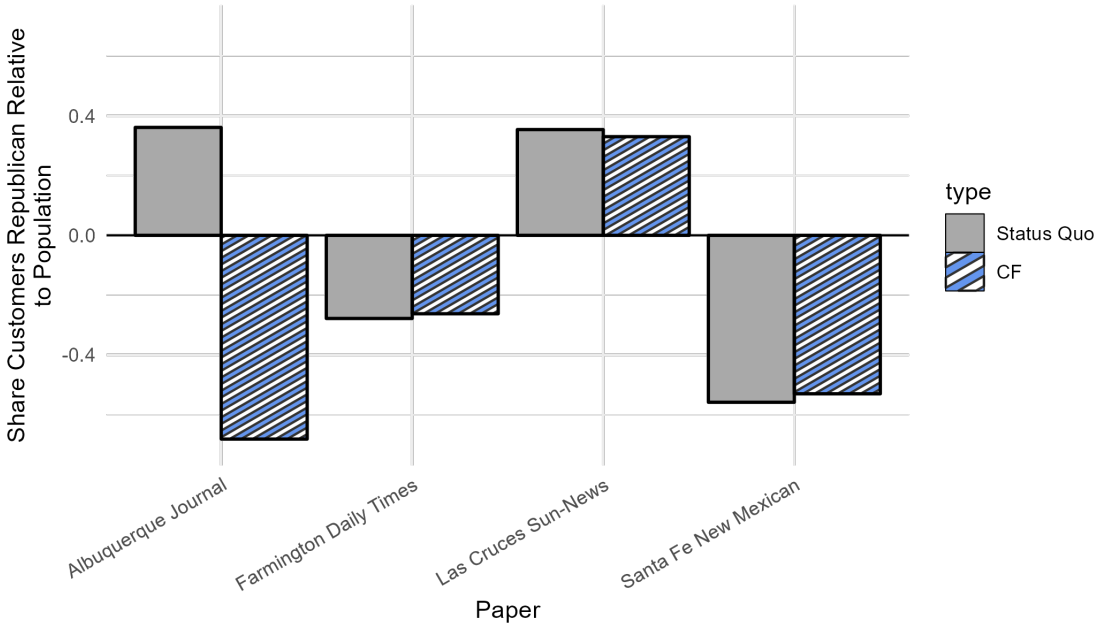


Figure shows the degree of polarized consumption attained by firms under the status quo and the counterfactual scenario. The Y-axis measures the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.

much in terms of polarization. As a result, the state-wide average polarization index increases from 37.8% to 57.2%.

Overall, this exercise serves as an additional way to illustrate the importance of both dimensions of news content in determining both the profit-maximizing product characteristics in equilibrium and the extent of polarization in consumption.

D.2 Counterfactual: Moderate Ideals

What if, instead of changing firm behavior, consumers became less polarized in their demand for ideological content? I simulate a counterfactual where Republican and Democratic ideal points are much more similar, at 0.058 and -0.058, respectively. Specifically, this implies that consumers demand newspapers whose ideological position is the same distance from neutral as that of the Congressional member with the most centrist voting record, Joe Manchin.

As this is an exaggerated scenario, it may best be interpreted as an extreme result of, perhaps, a statewide media literacy initiative. Consumers might then demand more objective reporting but still differ on actual policy preferences. If consumers actually were ideologically homogeneous, this might change other aspects of the model as well. For instance, the cost associated with slant might be due in part to the editorial labor needed to translate persuasive political rhetoric to more objective language. If voters were nearly ideologically united, politicians' rhetoric may also become less extreme, lowering the costs of providing neutral slant.

Figure 16 shows how firms change their product strategies, with the horizontal red and

blue lines now reflecting consumers' more moderate ideologies. Even with both consumer segments demanding more neutral slant, only the Albuquerque Journal shifts its slant strategy toward the center. The Las Cruces Sun-News does not significantly change its product positioning and the Farmington Daily Times has slant that is as extreme as under status quo, but now in the opposite direction. In contrast, the Santa Fe New Mexican actually has more extreme slant under moderate ideal points than under status quo.

Why do firms choose to provide slant that is more extreme than consumer ideology? First, in many markets, the firms' original slant choices are actually closer to the new, moderate ideal points than the consumer's actual ideal points under the status quo. So, even if firms did not adjust their strategies at all, they would actually increase their market shares in these areas. Second, I find that firms face lower costs for providing slightly Republican-leaning slant than neutral slant. The Albuquerque Journal serves a large enough market that the increased choice share from providing more ideal slant outweighs the costs. However, for the other, smaller-market papers, the increased demand from providing more neutral slant is outweighed by these cost considerations.

Figure 17 shows the extent of polarized consumption under the moderate ideal point counterfactual. As the two consumer segments are now more similar, the readerships of most newspapers now more closely reflects the population proportions of political parties. The average polarization index decreases from 37.8% to 8.7%. The exception is the Las Cruces Sun-News, which provides the most Republican slant and the most (Republican-preferred) specialized topic coverage. The Las Cruces Sun-News has a readership that is roughly 30% more Republican than the population under both the status quo and the counterfactual.

In sum, even if consumers demanded more neutral reporting, newspapers may still choose to provide the same levels of partisan slant. Moreover, as firms may still differentiate over topic coverage, some ideological segregation in news consumption may persist even for firms that shift towards more ideologically neutral reporting.

Figure 16: Counterfactual Product Positioning: Moderate Ideology

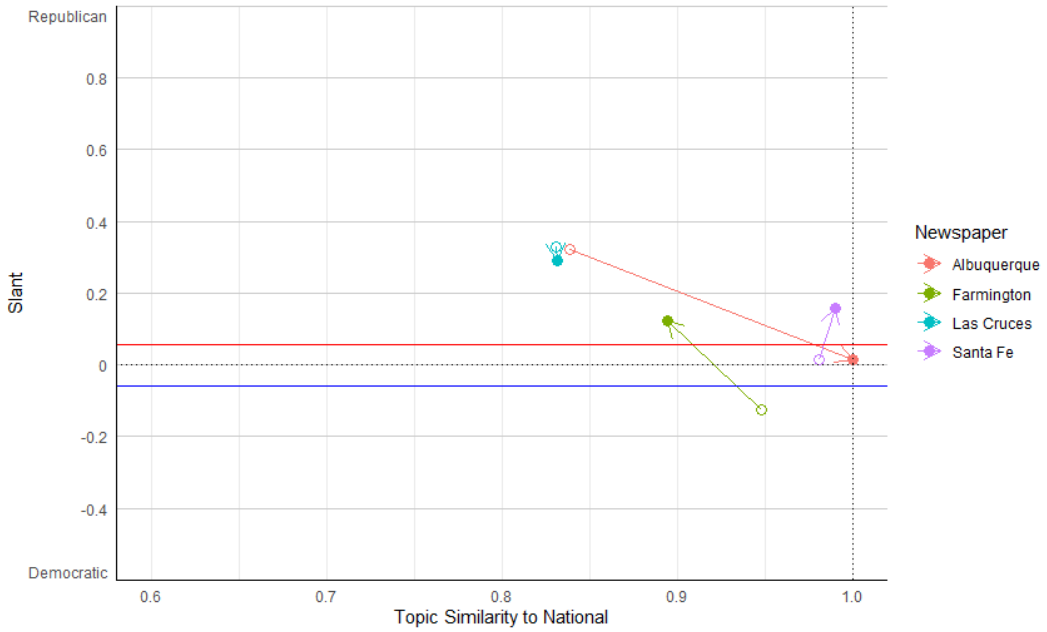


Figure shows change in firms' product positioning between the status quo choices (open circle) and the choices under the counterfactual (full circles). The Y-axis indicates the chosen slant, where positive is more Republican. The x-axis shows the chosen topic coverage, where more positive indicates that topic coverage is more similar to the average national newspaper.

Figure 17: Counterfactual Polarized Consumption: Moderate Ideology

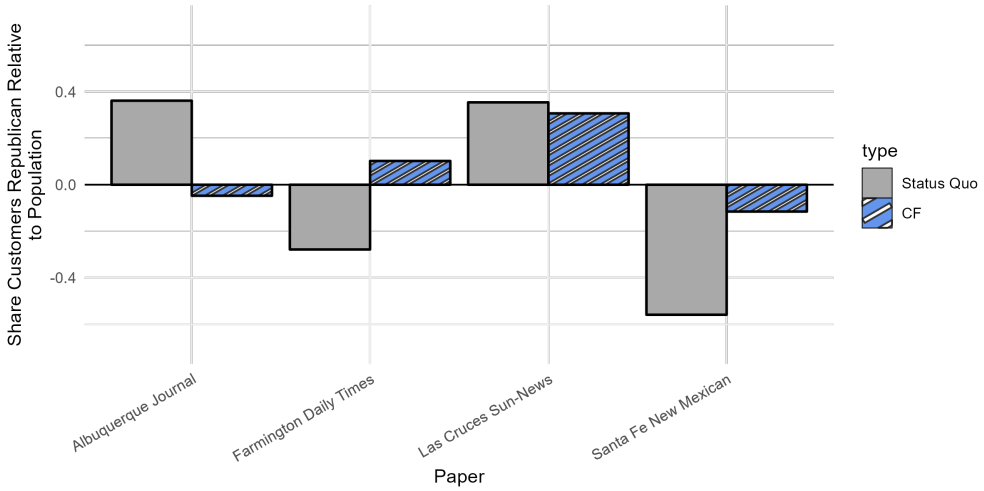


Figure shows the degree of polarized consumption attained by firms under the status quo and the counterfactual scenario. The Y-axis measures the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.

E Main Counterfactuals: Florida Market

In this Appendix, I simulate the main set of counterfactual scenarios in the Florida Market in the first quarter of 2021. Overall, though the exact outcomes differ somewhat, the results are largely consistent with the main conclusions in Section 5. Some polarization in consumption persists even with neutral slant, and increased entry causes increased polarization in the readership of the incumbent firm, the Orlando Sentinel. Under the status quo, the state-level average polarization index is 14.6%. Under the neutral slant counterfactual, the average polarization decreases to 8.1%. Under the firm entry counterfactual, the average polarization index increases to 19.9%.

Figure 18: Counterfactual Product Positioning: Neutral Slant, Florida

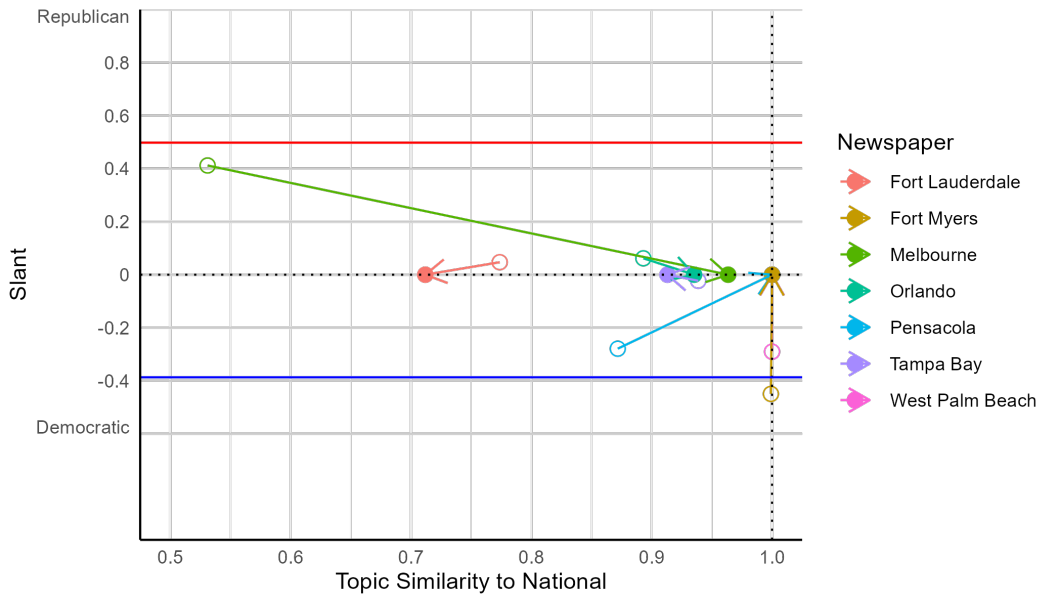


Figure shows change in firms' product positioning between the status quo choices (open circle) and the choices under the counterfactual (full circles). The Y-axis indicates the chosen slant, where positive is more Republican. The x-axis shows the chosen topic coverage, where more positive indicates that topic coverage is more similar to the average national newspaper.

Figure 19: Counterfactual Polarized Consumption: Neutral Slant, Florida

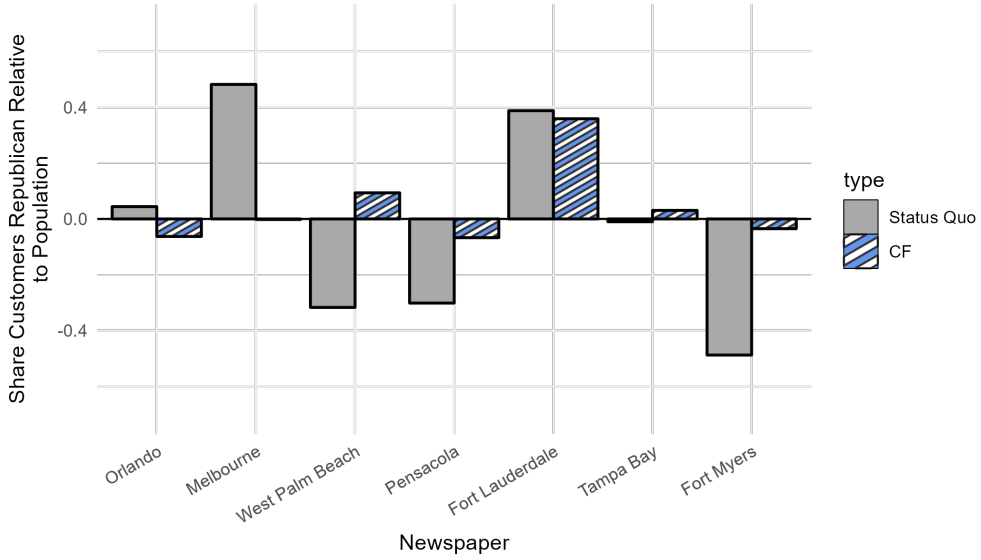


Figure shows the degree of polarized consumption attained by firms under the status quo and the counterfactual scenario. The Y-axis measures the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.

Figure 20: Counterfactual Product Positioning: Entry, Florida

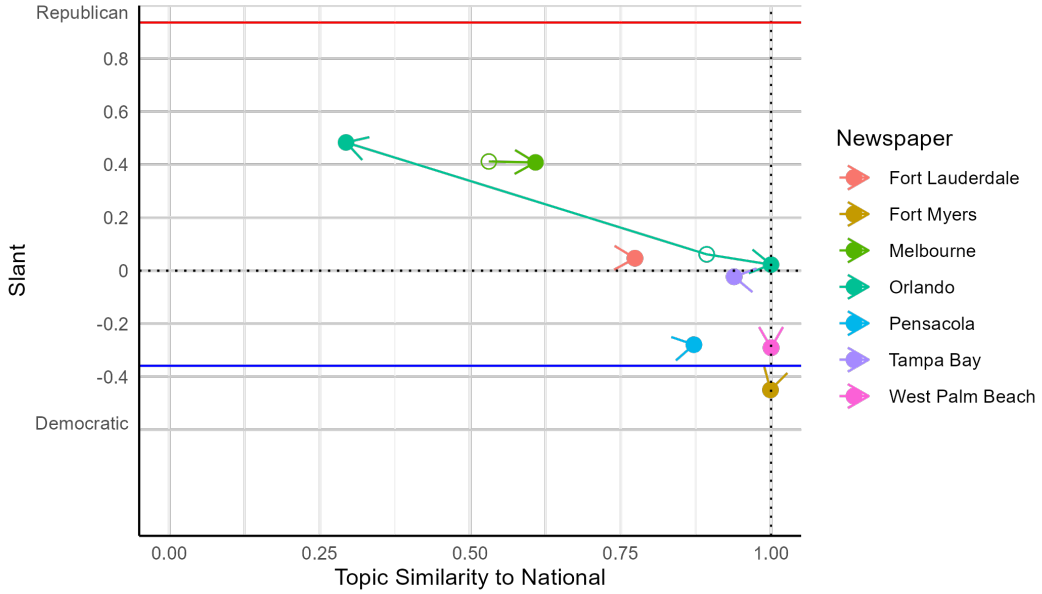


Figure shows change in firms' product positioning between the status quo choices (open circle) and the choices under the counterfactual (full circles). The Y-axis indicates the chosen slant, where positive is more Republican. The x-axis shows the chosen topic coverage, where more positive indicates that topic coverage is more similar to the average national newspaper.

Figure 21: Counterfactual Polarized Consumption: Entry, Florida

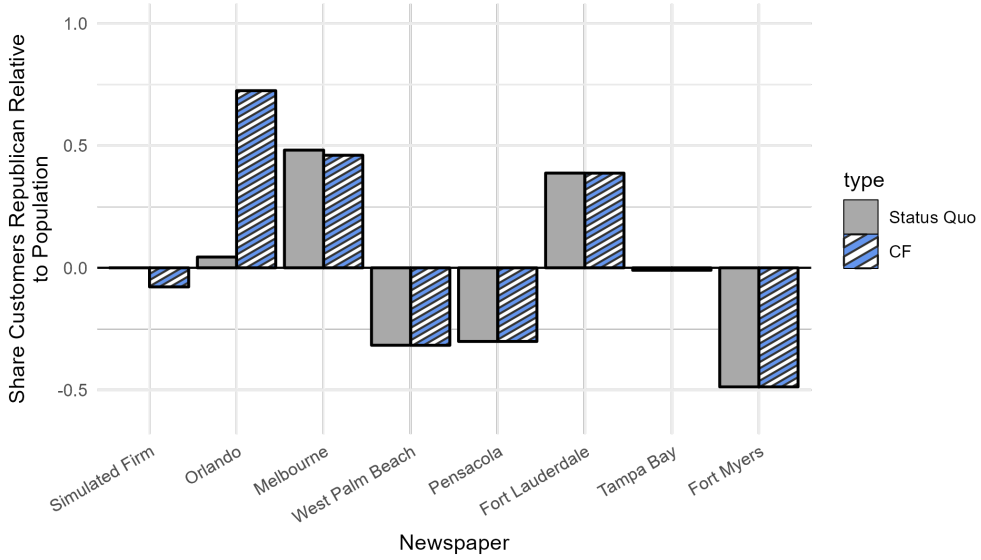


Figure shows the degree of polarized consumption attained by firms under the status quo and the counterfactual scenario. The Y-axis measures the relative difference between the share of consumers predicted to be Republican vs. the proportion of Republicans in the market population, as defined in Equation 18.